

Understanding food waste produced by tertiary students living in student flats: Implications for marketers and policy makers

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ABSTRACT

This thesis aims to investigate the global issue of food waste and how tertiary students living in student flats in Christchurch deal with the issue. Moreover, it examines the implications their behaviours and attitudes have for policy makers and marketers. After reviewing the literature, including food waste as an issue, the factors that lead to food waste, young adults and food waste and the approaches used to study food waste; the research method was developed. Through use of the qualitative research techniques: participant observation, fridge ethnography, garbology and the qualitative interviews, the research objectives were able to be explored in-depth. The analysis revealed that the types of foods being wasted by tertiary students living in student flats in Christchurch were predominantly avoidable and consisted mainly of fresh foods and leftovers. When it came to the disposing of food waste, many students took a hands off approach and were unlikely to correctly sort their waste into the Christchurch City Council red, green and yellow waste categories, even if they had a specific bin for each of these in their kitchen. Moreover, the most influential factor that led to food waste among tertiary students living in student flats in Christchurch was a lack of organisation when it came to meal sharing, shopping practices, cooking behaviours and overall waste behaviours and attitudes. Finally, these key findings helped to establish two key personas which classify the different types of students, when it came to food waste practices and behaviours; planners and impromptu consumers. The results allowed for two main recommendations to form which can be utilised by policy makers and marketers when attempting to reduce the food waste created by this food wasting group. It was firstly recommended to marketers that a student-oriented meal kit be designed and implemented within universities to try and take away some of the time and preparation that goes into reducing food waste. Secondly an educational based campaign was recommended to policy makers which utilises social media influencers to target tertiary students and foster a change towards more favourable food waste practices among this group.

1. INTRODUCTION

1.1 BACKGROUND

Every year, four billion metric tonnes of food is produced throughout the world, however 30 - 50% of this is never consumed (Chen, 2018; Lehmann, 2015). Consequently, approximately 1.3 billion tonnes of food is wasted each year, costing one trillion US dollars (Grandhi & Singh, 2015; Gustavsson, Cederberg & Sonesson, 2011; WRAP, 2007). Not only is food waste a catastrophic economic issue, but also an environmental issue due to the inefficient use of the world's natural resources, with 25% of the world's freshwater supply and 50% of the world's habitable land used to produce food which will largely be wasted (Hall et al., 2009; Ritchie, 2019). Furthermore, food waste presents an ethical and social issue as even though there is an abundance of food production throughout the world not everyone has equal access to it (Aschemann-Witzel, 2018a).

In developed countries food wastage occurs predominantly in the final stages of the food supply chain with consumers in these countries responsible for two thirds of food waste. Moreover, 60% of this waste is believed to be avoidable (Buzby et al., 2014; Qi & Roe, 2016). An individual's food wasting behaviours are highly complex with many factors influencing wasting behaviour and practice. However, the most common forms of wastage have been found to come from plate waste, spoilage due to poor planning, and excess purchase due to impulse and bulk buying (Lazell, 2016). In addition, studies have shown that young adults, including those attending university and other tertiary institutions, are a group susceptible to food waste, and are therefore one of the largest sources of preventable food waste (Bravi, Murmura, Savelli & Viganò, 2019; Nikolaus et al., 2018). This comes from having heightened spontaneity levels, a desire for convenience and limited food management experience (Thyberg & Tonjes, 2016). In recent times, food losses and waste have received increased attention from scholars and policy makers alike due to the environmental, economic, and social impact of the issue (Evans et al., 2012), and the fact that mitigating food waste is an important task for mankind in order to establish a sustainable future (Lipinski et al., 2013).

1.2 KEY DEFINITIONS

The food supply chain, including handling, storage, processing, packaging, distribution, retail and final consumption and/or disposal, is the pathway food takes from initial production to final consumption (Buzby et al., 2014; Gunders, 2012; Gustavsson et al., 2011). Food loss is therefore defined as any food that was intended for human consumption but is lost for any reason during the production, manufacture, distribution, or retail stages of the supply chain (Buzby et al., 2014; Parfitt et al, 2010). On the other hand, food waste is any edible item that is not consumed in the final stage of the food supply chain, also known as the consumer level (Buzby et al., 2014; Gustavsson et al., 2011).

Food waste can also be categorised into unavoidable, avoidable and possibly avoidable depending on the edibility of the waste. Avoidable food waste is any waste that was edible prior to disposal, therefore, any food that could have been eaten if it were stored or prepared differently. Whereas, unavoidable food waste is food that is inedible, such as shells, bones, and coffee grounds (Koivupuro et al., 2012; WRAP, 2008). However, the later definition is up to discrimination as some ‘inedible’ foods that could be repurposed before being discarded, such as using bones and vegetable peels used to make stock (Isensee, 2016).

1.3 CONTEXT

In Australia, food waste was found to be the single largest component of the domestic kerbside waste stream, reaching almost 38% by weight (Lehmann, 2015). Furthermore, food scraps are the largest category of materials found in landfills and consequently contribute to the emission of methane gas (IPCC, 2013). In New Zealand alone, food waste made up 17% of the total waste stream, with this figure not including food waste which was disposed of through alternate methods such as at home composting (Reynolds, Miroso & Clothier, 2016). Therefore, Christchurch has been selected as the focus of the study due to its unique kerbside collection service. The Christchurch City Council provides three bins to all households, one for rubbish, one for

recyclables, and one for compostable food and garden waste (Christchurch City Council, 2019a). Unlike other councils who typically provide only a general rubbish and recycling kerbside collection, Christchurch's organics collection allows residents to easily compost their food and garden waste. This makes Christchurch the ideal setting to gauge whether food waste is being correctly disposed of by tertiary students living in student flats.

1.4 RESEARCH OBJECTIVES

The exploratory study has been designed with the intention of examining the following research objectives:

1. To determine what sorts of food are being wasted among tertiary students living in independent living situations (student flats) in Christchurch.
2. To determine whether food is being properly disposed of (composted) by tertiary students living in student flats in Christchurch.
3. To determine the factors that lead to food wastage among tertiary students living in student flats in Christchurch.

1.5 CONTRIBUTIONS

In terms of the theoretical contributions, this study aims to fill a gap in the literature surrounding the attitudes, beliefs and behaviours towards food waste of New Zealand students living in student flats as well as adding to the very minimal literature on food waste in New Zealand. Practically, the study aims to create a foundation for reducing the overall volume of food waste created by tertiary students, as well as redirecting the food waste that is created to organics composting. This will be achieved by gaining a better overall understanding of this group who are susceptible to creating large amounts of avoidable food waste. The data gathered will be provided to relevant stakeholders, such as the Christchurch City Council and the University of Canterbury, who could

use the information to produce resources that will ultimately help to reduce the food waste produced by this group and direct any food that cannot be consumed to compost.

1.6 OUTLINE

In order to address the research questions six chapters are necessary to explore the current literature, methods, findings and discussion related to food waste produced by tertiary students living in student flats in Christchurch. The second chapter introduces a summary of the relevant literature including the problem that is food waste, factors that lead to food waste, young adults and food waste and the approaches used to study food waste. Chapter Three presents the research methods including the research purpose, research philosophy, methods and ethical considerations. Next, Chapter Four discusses the findings including those from participant observation, fridge ethnography, garbology and the qualitative interviews. The final chapter is dedicated to analysing and discussing the study insights, as well as the implications and limitations of the study; the recommendations; and any potential future research directions. It then summarises the information with the conclusion.

2. LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews existing literature relevant to this study. The main subject domain is research on food waste, specifically household food waste, produced by young adults living in New Zealand. This review finds that there is, at present, insufficient research on food waste research, especially related to young adults in New Zealand. As a result, although this chapter looks at the problem of food waste holistically, it has a strong focus on these key areas including tertiary aged students living in student flats and their food waste attitudes and behaviours.

The chapter begins by looking in-depth into the problem of food waste, firstly seeking to identify a definition and classifications for the term ‘food waste’. This is followed by defining: food waste in New Zealand; the food supply chain; disposal of food waste; the impacts, including environmental, social and economic, of food waste; and then consumer food waste with a focus on waste produced in the household. The second section explores the factors which lead to food waste, including attitudes and food waste-related behaviours, such as meal planning and shopping habits; leftover use and storage habits; and date labels. The third section discusses young adults and food waste and the reasons for this group being one of the biggest contributors to household food waste. Next, the approaches used to study food waste are explored, and finally the gaps within the literature are identified.

2.2 THE PROBLEM OF FOOD WASTE

Food waste is a catastrophic issue; however many people are blind to its effects and therefore do not understand or even realise the detrimental impacts it causes (Love Food Hate Waste NZ, 2019). Every year approximately 1.3 billion tonnes, or one-third of the food that is produced throughout the world is wasted, costing one trillion US dollars (Grandhi & Singh, 2015; Gustavsson, Cederberg & Sonesson, 2011; WRAP, 2007). More specifically, of the four billion metric tonnes

of food produced each year, 30-50% of it never reaches a human stomach (Chen, 2018; Lehmann, 2015). Furthermore, in Australia, food waste was found to be the single largest component of the domestic kerbside waste stream, reaching almost 38% by weight (Lehmann, 2015). It is also believed that in developed countries over 60% of food waste is avoidable, with the most common forms of wastage coming from plate waste, spoilage due to poor planning, or excess purchase due to impulse and bulk buying (Lazell, 2016).

The issue of food waste is rapidly gaining traction throughout environmental debate as well as the policy and regulatory arena (Evans et al., 2012). However, waste, and more specifically food waste, is considered a wicked problem because the creation of it is a complex, global problem that cannot be solved within the context of a single discipline. Rittel and Weber (1973) define a wicked problem as a highly complex social problem that is so complicated that identifying a clear solution, determining the source of the problem or even its definition can appear impossible. These types of problems typically include multiple stakeholders who are all likely to be affected by the ripple of change that can occur when there is any implementation of a solution. Furthermore, implemented solutions are likely to present unexpected consequences for society and are unlikely to solve the core problem but rather change its nature (Kennedy, 2015; Kennedy et al., 2017; Rittel & Weber, 1973). Therefore, the improvement of a wicked problem is typically used to measure progress as opposed to a stopping rule for determining when a wicked problem is solved (Kennedy, 2015).

2.2.1 Definition of Food Waste

The definition of food waste, which is commonly intertwined or confused with food loss, is continually evolving throughout the literature and therefore there appears to be a lack of an established definition.

The Food & Agriculture Organisation (FAO) define *food loss* as the volume of edible food waste intended for human consumption that is lost in the process of production, manufacture, distribution and consumption, also known as the food supply chain (Parfitt et al, 2010). This loss can occur from natural shrinkage; cooking processes; damage from mould; pests or inadequate storage; plate

waste; or consumer or retail food waste (Buzby et al., 2014). Furthermore, the FAO defines *food waste* specifically as food losses which occur in the final stage of the food supply chain i.e. at the hands of retailers and/or consumers (Gustavsson et al., 2011). Similarly, the United States Department of Agriculture defines *food loss* as the amount of edible postharvest food that is available for human consumption, but is not consumed for any reason (Buzby et al., 2014). They further define *food waste* as any edible item that is unconsumed at the retail or consumer stage (Buzby et al., 2014). In comparison, Girotto et al. (2015) define *food waste* as any food which is intended for consumption but is instead discarded and left to spoil by any of the actors in the supply chain. However, typically *food loss* is seen to be created through the reduction of the quality and quantity of food as it passes through the supply chain and therefore occurs in agriculture, processing and manufacturing activities (FAO, 2018).

For the purpose of this study, although food losses can occur at all stages of the food supply chain, food waste is defined as any losses in food at the consumer level, and more specifically within the household, which were intended for human consumption. This can be seen in more detail in Figure 2.1.

2.2.2 Classification of Food Waste

Food waste, and more specifically household food waste, can be separated into three categories based on the nature of the waste: unavoidable, possibly avoidable, and avoidable waste. Unavoidable food waste is any food that arises as a result of food preparation and, under normal circumstances, is not edible (Parfitt et al., 2010; Secondi et al., 2015). For example, bones and eggshells, however this definition can be disputed by personal conception of the term ‘edible’ (Parfitt et al., 2010; Secondi et al., 2015). In comparison, possibly avoidable and avoidable food waste is any food which was edible at some stage prior to disposal (Parfitt et al., 2010; Secondi et al., 2015). The distinction between possibly avoidable and avoidable however, is that possibly avoidable food waste includes foods that are eaten by some people but not others, such as bread crusts, or alternatively, foods which have been discarded based on the way a food is prepared, such as potato skins (Parfitt et al., 2010).

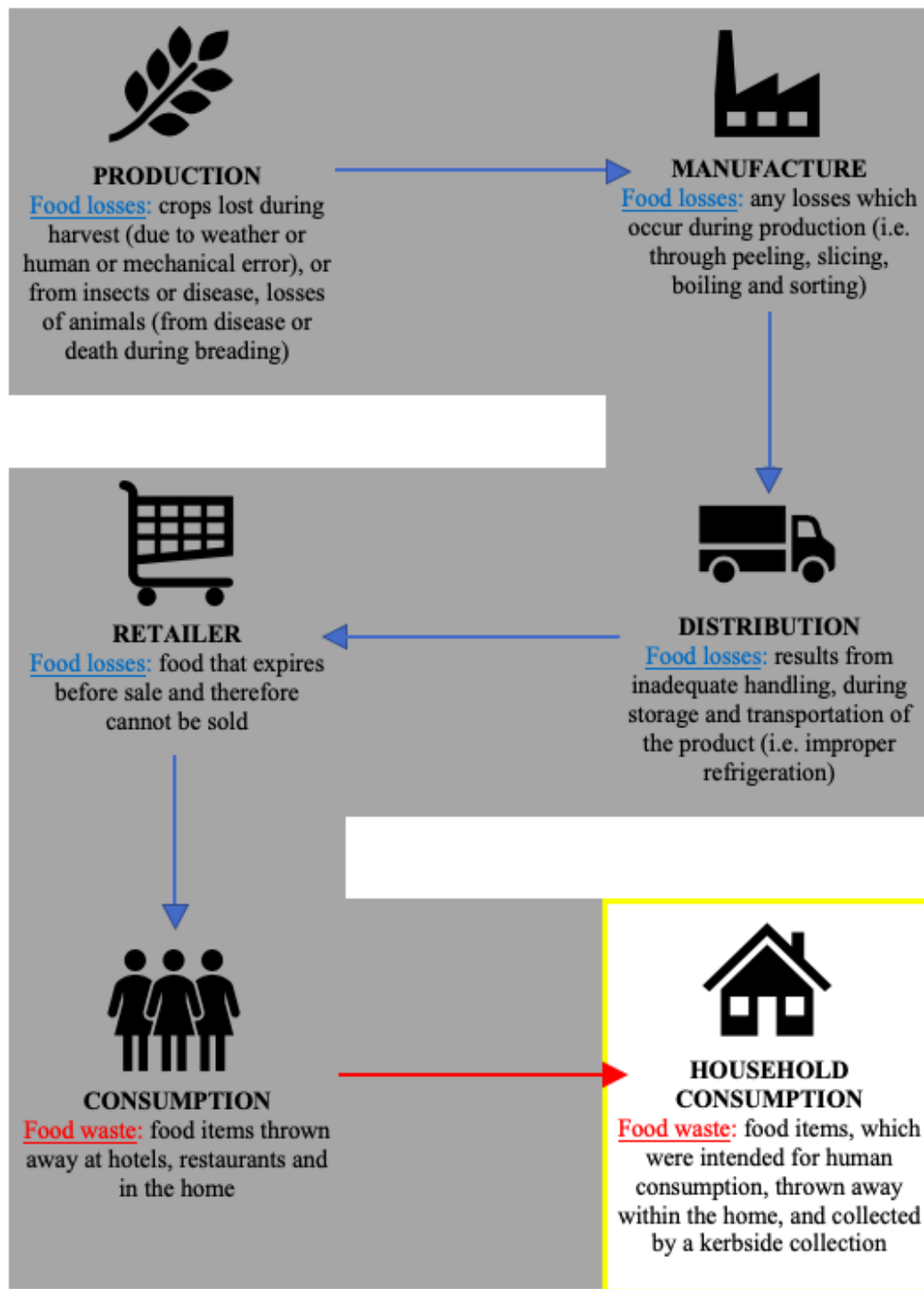


Figure 2.1: Food Losses vs. Food Waste in the Food Supply Chain. Adapted from FAO of the United Nations. (2017).

2.2.3 Food Waste in New Zealand

In New Zealand, there is an estimated 157,000 tonnes of food waste created annually which is approximately 32kgs per person (Seddon, 2020). In economic terms, there is \$872 million worth of food waste created each year (New Zealand Parliament, 2018), equating on average to \$644 per household per year (Seddon, 2020). In 2011 New Zealand households alone generated over 224,000 tonnes of food waste, or 79 kilos per household, of which 122,547 tonnes was said to be avoidable (WasteMINZ, 2019b). It is believed that this amount of avoidable waste would be able to, in calorific terms, feed between 50,000 – 80,000 people a year (Reynolds, Miroso & Clothier, 2016). Furthermore, food waste made up 17% of the total New Zealand waste stream, with this figure not including food waste which was disposed of informally, such as at home composting or as feed for animals (Reynolds, Miroso & Clothier, 2016). Seddon (2020) found that in New Zealand the three main categories of food that ended up being discarded were: bread, leftovers and citrus.

Although New Zealanders nominated waste and rubbish as the second most crucial environmental challenge in New Zealand, Tucker and Farrelly (2016) found conflicting attitudes and behaviours when asking questions specifically related to food waste. Rather than utilising the organics bin or other informal disposal methods, 78% of respondents stated that they put some food waste in their rubbish bin whilst 19% stated that they put all of their food waste in the rubbish bin (Tucker & Farrelly, 2016).

In 1995, the National Census of Landfills was conducted by the Ministry for the Environment. They found 327 legally operating landfills in New Zealand (Ministry for the Environment, 1997). These landfills dealt with heavily contaminated materials such as household kerbside waste, commercial and building waste, and certain types of hazardous waste (Auckland City Council, 2019). Although these statistics are yet to be updated, the figure is believed to be around the same. However, there is now just one facility in New Zealand which specifically deals with turning food waste into fuel. This facility handles over 35,000 tonnes of food waste per annum (New Zealand

Parliament, 2019), which is only a very small percentage of the total food waste created in New Zealand each year.

2.2.4 Food Supply Chain

The pathway that food takes from initial production to final consumption is known as the food supply chain. It includes handling, storage, processing, packaging, distribution, retail and final consumption and/or disposal (Buzby et al., 2014; Gunders, 2012; Gustavsson et al., 2011). Food waste can occur throughout all stages of the food supply chain, however, it is noted throughout the literature that in developing countries, losses are primarily due to a lack of food chain infrastructure, transportation and technology and also limits in cultivation and harvesting (Godfray et al., 2010). Whereas in developed countries, losses are predominantly in the final stages of the food supply chain, from a combination of surplus food generation and consumer behaviours (Gustavsson, Cederberg & Sonesson, 2011). Therefore, it is noted that there is a greater opportunity for change in developed countries as they generate higher volumes of food losses, or food waste, at this final stage of the process (van der Werf & Gilliland, 2017).

2.2.5 Disposal of Food Waste

Western societies have been found to favour disposing of waste rather than attempting to stop the creation of it. This is demonstrated through the design and creation of eradication methods such as incinerators, deep well injection sites, carbon sequestration mechanisms, sanitary landfills and toxic waste dumps (McTaggart, 2015). Moreover, in developed countries, disposal of domestic food waste can occur both formally and informally. Informal methods, such as home composting are generally less common (Gunsilius, Spies & García-Cortés, 2011; Seng, Kaneko, Hirayama & Katayama-Hirayama, 2011), despite the proven benefits a composting system can provide, including replacing fertilizer use, increasing the quantity of produce sold, and diverting organic waste from landfills (Mu, Horowitz, Casey & Jones, 2017; Waqas et al., 2018). Formal waste disposal systems, where food waste is usually discarded, are established in developed countries by local governments and disposal businesses (Reynolds et al., 2014). In New Zealand, food waste is

formally discarded through kerbside collection coordinated by the municipal authorities (Ministry for the Environment, 2019). This waste is taken to landfill, or, in the case of organic bins, is turned into compost (Christchurch City Council, 2019a; Christchurch City Council, 2019b). However, this form of waste disposal requires individuals to dispose of their food waste in the correct ‘organics’ bin to ensure food waste does not end up in landfill (Hyder Consulting, 2012). It is evident that this is not always the case as food waste now accounts for a higher percentage of material in landfills than any other category of waste (Chen, 2018).

At present, Christchurch and Timaru are the only councils in New Zealand which provide a kerbside organics collection along with general waste and recycling (Christchurch City Council, 2019a; Timaru District Council, 2019). Other regions, including Dunedin, Hamilton, and Wellington, have composting centres available. However, in these areas, individuals must transport the organic waste to these centres themselves and pay to dispose of the waste once they get there (Dunedin City Council, 2019; Hamilton City Council, 2019; Wellington City Council, 2019). Therefore, as people usually do not have time or possess the effort required to go to their local composting centre, the disposal of waste, and more specifically the disposal of organic waste, is up to user discretion. Consequently, the levels of food waste sent to landfill are typically higher in regions which do not have a council run kerbside collection (Woolf, 2019).

Other councils in New Zealand have trialled a kerbside organics collection. The Mackenzie District Council implemented an organic waste kerbside collection scheme in May 2002 in response to landfill closures in the area, however this is no longer in operation (Ministry for the Environment, 2005). In addition, the North Shore City Council implemented an eight-week organic waste trial in 2003 made up of 400 households (Ministry for the Environment, 2005). At present the wider Auckland City Council is yet to implement a kerbside organics collection, however, a proposed kerbside organics collection is scheduled for 2021 (Molyneux, 2019).

In Christchurch, the Council’s contractor collects the organic waste weekly from the green-lidded bins placed on the kerbside, which are comprised of a combination of food and garden waste (Christchurch City Council, 2019c). This kerbside collection was implemented in 2009 and use by residents has remained relatively consistent since its commencement as seen in Figure 2.2

(Christchurch City Council, 2014; Christchurch City Council, 2019c). The standard size of these green bins is 80 litres, however residents can request a 240 litre bin for an additional annual charge. On average, 57% of organics bins are presented for collection each week, with an average weight of 11.60 kg (Christchurch City Council, 2019c). This waste is transported to the Council's organics processing plant, which is operated by Living Earth (WasteMinz, 2019a), and processes nearly 50,000 tonnes of food waste and green waste from Christchurch households each year (Living Earth Limited, 2019). The waste is then converted to compost and sold to consumers. In 2017, the largest volume of organic waste since the implementation of the operation was collected through the kerbside collection, equating to 54,000 tonnes (Christchurch City Council, 2019c).

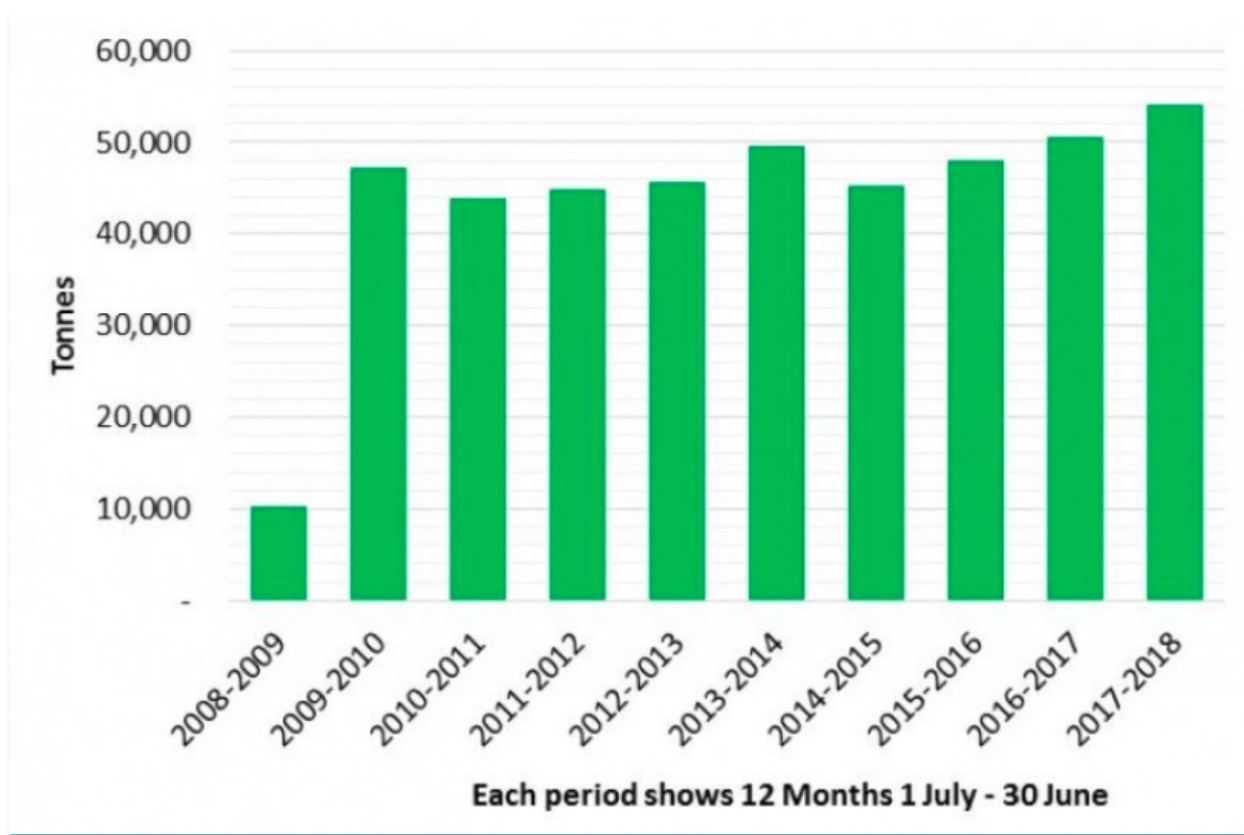


Figure 2.2: Annual Kerbside Organics Tonnage Collected Since March 2009 (Christchurch City Council, 2019c).

In comparison, the waste collected from the red-lidded wheelie bins in Christchurch is collected fortnightly and consists of general household waste (Christchurch City Council, 2019c). The

standard size of these bins is 140 litres which is the maximum size available for general rubbish. In comparison to the organic bins, an average of 84% of rubbish bins are presented each fortnight for collection, with an average weight of 13.25 kg (Christchurch City Council, 2019c). This waste is taken to the Kate Valley landfill which is located 70 km north of Christchurch (Transwaste Canterbury, 2019). In the 2012 waste audit, organic waste made up 32% of the total waste volume sent to landfill by Christchurch residents, all of which could have been placed in the green organics bin (Christchurch City Council, 2014).

2.2.6 Impacts of Food Waste

Over time, society has “evolved from a culture where no food was wasted to a society where wasting food is accepted as a fact of life” (Calvo-Porrall, Medín & Losada-López, 2017 pg. 42). Food waste is now a catastrophic environmental, social and economic issue. It is also set to become an even bigger issue not only due to global population increase (Kummu, de Moel, Porkka, Siebert, Varis & Ward, 2012), but also the nature of human consumption as according to the United Nations, the amount of the planet’s natural resources extracted for human use has more than tripled in 40 years and is set to increase even more in the near future (Climate News Network, 2016).

2.2.6.1 *Environmental*

From cradle-to-grave, food production creates greenhouse gas emissions, which are the most significant human-made driver of observed climate change. In addition to this, food waste is an inefficient use of scarce resources, such as water and electricity, making it a deleterious environmental issue (Baker, Fear & Denniss, 2009; Cuéllar, & Webber, 2010; Garnett, 2011; Gunders, 2017; Reynolds et al., 2014). Furthermore, the food supply chain also has significant impacts on water consumption, land deterioration and energy and therefore creating food waste means that these resources are being depleted for no relative benefit (Maldonado Juarez, Nilsson, 2019). The FAO (2013) has estimated that if global food waste was represented as a nation, its carbon footprint of 3.3 Gtonnes of CO₂ would rank it as the third highest emitter of greenhouse gases closely following China and the USA. Moreover, although throwing out small amounts of

food every so often may not seem like a catastrophic issue, global emissions from food are four times those produced by airlines (Seddon, 2020).

It has been estimated that almost 29%, or 55 million metric tonnes of annual food production becomes avoidable food waste (Venkat, 2011). In 2014, 38 million pounds of municipal food was disposed of in the USA. Of this amount, only 5.1% was composted, 18.6% was used in combustion for energy recovery, and the remaining 76.3% was sent to landfill (Environmental Protection Agency, 2016). When food, and other biodegradable waste is sent to landfill, the anaerobic burial conditions can prevent proper decomposition. Consequently, this waste can remain intact for decades (Ministry for the Environment, 1997). Furthermore, when biodegradable food waste ends up in landfill it contributes to the release of methane gas, which according to the IPCC (2013), is more potent than carbon dioxide with 34 times the global warming potential over 100 years. Scientists have developed technologies which are capable of harvesting this methane for biogas, however less than 10% of methane is captured with the rest being emitted into the atmosphere (Themelis & Ulloa, 2007).

2.2.6.2 *Social*

There are an estimated 821 million people in the world with insecure access to food (World Food Programme, 2018). Therefore, food waste also becomes a social issue as it is regarded as unethical to waste food when there is unequal access to food and food insecurity across the globe (Aschemann-Witzel, 2018a; Buzby & Hyman, 2012; Foley et al., 2011). The demand for food increases simultaneously with population growth, and therefore, wasting food affects food security negatively and ultimately creates a shortage of food (Stancu et al., 2016; Thyberg & Tonjes, 2015). Furthermore, Rutten et al. (2015) found that food losses and food waste in the European Union have a significant effect on worldwide and local food prices in sub-Saharan Africa, exemplifying that some societies have the ability to purchase more than they consume, whilst others are unable to access what they require for everyday consumption. This issue is heightened by a lack of responsibility taken by those who over-consume. A study in Australia found that although there was some recognition of food waste as a problem, many people do not acknowledge that they

make any personal contribution to the problem, but rather it is caused by others (Lehmann, 2015). Furthermore, only 14% of the respondents in the study believed they were throwing away more food than they should be (Lehmann, 2015).

2.2.6.3 *Economic*

Economically, food waste is an issue for consumers, companies and governments alike due to the incurred costs associated with food waste that are never recovered (Guinée et al., 2006). There is an estimated 680 billion USD invested into the food supply chain every year (FAO, 2011). Additionally, the costs of food waste in the European Union alone are estimated at 143 billion euros (FUSIONS, 2019).

Considering the severe impacts, reducing food waste throughout the world has the potential to produce substantial environmental, social, and economic benefits and contribute towards a more sustainable future (Papargyropoulou, Lozano, Steinberger, Wright & Ujang, 2014). These include an estimated reduction in greenhouse gas emissions of 2.7 million tonnes simply by preventing avoidable food waste (Oakdene Hollins, 2013). In terms of economic benefits, prevention of food waste would reduce the waste management budgets for local authorities and governments alike due to decreased quantities of waste. Furthermore, at an individual level, consumers would have the opportunity to spend their financial resources in more economically productive endeavours (WRAP, 2019). The prevention of food waste will also help to address the issue of food insecurity both locally and globally, by redirecting surplus food to those who need it most (Nunes, 2011), mitigating food insecurity and therefore increasing food availability (Pires, 2018).

2.2.7 Consumer Food Waste

McTaggart (2015) states that humans and rubbish go hand in hand, making it difficult to consider any human activities that do not create some sort of waste. However, even though wastage occurs in all stages of the food supply chain, a majority is produced at the consumer level with over half of all food waste being created in the home (Aschemann-Witzel, 2018b; Block et al., 2016; Carter,

2019; Roe et al., 2018). The consumption stage of the food supply chain is made up of households; food services, such as the hospitality sector and restaurants; and institutions, such as hospitals and schools (Papargyropoulou et al., 2014). Consequently, Principato (2018) defines consumer food waste as all food acquired by consumers in any store or service related to food that is not consumed. In 2011, Gustavsson et al. estimated the total weight of food waste generated at the consumer level in industrialised countries to be 222 million tonnes which is comparable to the total net food production in sub-Saharan Africa of 230 million tonnes.

2.2.7.1 *Household Food Waste*

More specifically, household food waste is defined as the amount of waste that is generated from the domestic consumption of food and drinks, which includes home-grown products and takeaways, but does not include the consumption of food and drinks outside of the home (Parfitt et al., 2010). In developed countries, household food waste has been found to be the largest contributor to food waste at the consumer level (Principato, 2018). Stenmarck et al. (2016) have estimated that in the European Union, 53% of total food losses and waste are produced in households equating to 88 million tonnes, and 98 billion euros per annum.

In the European Union, two major groups have been identified as contributing the most to the creation of household food waste (Secondi et al, 2015; Principato, 2018). These groups are firstly, young people aged 15-24, and secondly, families with young children.

2.3 FACTORS THAT LEAD TO FOOD WASTE

See Table 2.1 (Factors that Lead to Food Waste and Corresponding Studies) for a breakdown of the subsequently discussed food waste related studies and the factors they examine.

Factor	Author (year of publication)
Individual characteristics	Di Talia, Simeone & Scarpato, 2019
Individuals awareness of the negative effects of food waste	Cox & Downing, 2007; Quested, Marsh, Stunell & Parry, 2013; Quested, Parry Eastal & Swannell, 2011
Individuals awareness of own food waste contributions	Hamilton, Denniss & Baker, 2005; Lehmann, 2015
Negative attitudes towards food waste	Bolton & Alba, 2012; European Commission, 2014; Evans, 2012; Neff et al., 2015; Stefan et al., 2013
Visceral factors (i.e. emotions, hunger, values and habits)	Ganglbauer, Fitzpatrick & Comber, 2013; Loewenstein, 1996; Setti, Banchelli, Falasconi, Segre & Vittuari, 2018; Verplanken, Aarts, van Knippenberg & Moonen, 1998
Routine behaviours	Evans, 2012; Stancu et al., 2016; Stefan et al., 2013
Intentional and routine food waste	Stancu et al., 2016; Stefan et al., 2013
Over-buying/over-cooking of food	Aschemann-Witzel et al., 2015; Cox & Downing, 2007; Evans, 2011; Evans, 2012; Farr-Wharton, Foth & Choi, 2014; Graham-Rowe, Jessop, Sparks, 2014; Griffin, Sobal & Lyson, 2009; Neff et al., 2015; NSW EPA, 2012; Quested et al., 2013b; Stancu et al., 2016; Stefan et al., 2013; Visschers, Wickli & Siegrist, 2016
Failure to plan meals in advance	Doron, 2012; Farr-Wharton, Foth & Choi, 2014; Principato, Secondi & Pratesi, 2015; Nikolaus, Nickols-Richardson & Ellison, 2018; Quested et al., 2013; Stefan et al., 2013; Stancu et al., 2016
Neglecting to use or follow a shopping list	Cox & Downing, 2007; Farr-Wharton, Foth & Choi, 2014; Pearson et al., 2013; Principato, Secondi & Pratesi, 2015; NSW EPA, 2012; Quested et al., 2013; Stefan et al., 2013

Omitting to carry out a food inventory prior to shopping	Nikolaus, Nickols-Richardson & Ellison, 2018; Stancu et al., 2016; Stefan et al., 2013
Impulse purchases	Doron, 2012; Pearson et al., 2013;
Price driven shopping habits (i.e. sales)	Cox & Downing, 2007; European Commission, 2014; Evans, 2012; Neff et al., 2015; NSW, 2012; Pearson et al., 2013; Sustainability Victoria, 2011
Marketing, sale strategies and promotions made by food corporations	Kumar, 2015; Mondéjar-Jiménez, Ferrari, Secondi & Principato, 2016; Principato, Secondi & Pratesi, 2015; Wansink, 2018
Risk of foodborne illness	Exodus, 2007; Graham-Rowe, Jessop & Sparks, 2014; Neff et al., 2015; Qi & Roe, 2016
Food that has been forgotten about or expired	Kantor et al., 1997
Lack of knowledge on proper storage habits and leftover use	Cox & Downing, 2007; NSW, 2012; Stancu et al., 2016; Stefan et al., 2013
Inability to read and understand best-before dates	Bravi, Murmura, Savelli & Viganò, 2019; European Union, 2015; Graham-Rowe, Jessop & Sparks, 2014; Mirghotbi & Pourvali, 2013; Monier, 2010; Neff, Spiker, Rice, Schklair, Greenberg & Leib, 2019; Setti, Banchelli, Falasconi, Segre & Vittuari, 2018; Van Boxtael, Devlieghere, Berkvens, Vermeulen & Uyttendaele, 2014

Table 2.1: Factors that Lead to Food Waste and Corresponding Studies

In the past, literature has tended to focus on the overall consequences of food waste rather than the factors that influence it (Qi & Roe, 2016; Stancu et al., 2016; Stefan et al., 2013). However, as consumer behaviour is largely related to individual characteristics, context, including where people live, helps to shape their particular attitudes and behaviours towards food waste (Di Talia, Simeone & Scarpato, 2019). These individual characteristics influence the food provisioning process (FPP). The FPP describes a series of food-related behaviours that individuals go through when consuming food. This begins with the acquisition of food and ends with post-consumption practices such as disposal (Stefan et al., 2013; Vidgen, 2016). Psychosocial factors, such as attitudes, along with

food-related behaviours, such as meal planning and use of leftovers, affect the decision-making process throughout the FPP (Quested et al., 2013; Stancu et al., 2016; Stefan et al., 2013). Consequently, the decisions made throughout this process affect the total amount of food consumers waste.

Studies have found that attitudes, perceptions and norms can significantly affect behavioural routines illustrating how attitudes and food-related behaviours interact (Graham et al., 2014; Quested et al., 2013; Stancu et al., 2016; Stefan et al., 2013). Consequently, both predictors are extremely important when attempting to understand food waste at the household level (Aschemann-Witzel et al., 2015; Graham et al., 2014; Quested et al., 2013; Stancu et al., 2016). Within the literature there appears to be relatively low public awareness of the negative effects created by household food waste (Cox & Downing, 2007; Quested, Marsh, Stunell & Parry, 2013; Quested, Parry Eastal & Swannell, 2011). Furthermore, there is also a lack of awareness when it comes to one's own food waste contributions (Cox & Downing, 2007; Hamilton, Denniss & Baker, 2005). Therefore, these factors are also incredibly important to consider as consumers are not always able to explain how and why they have wasted food. This is because they may not recognise they are wasting food or instead they may be in denial about the food that they waste (Lehmann, 2015).

2.3.1 Attitudes

An attitude can be defined as a learned predisposition to respond in a consistently favourable or unfavourable manner to a given object, concept or idea (Fishbein & Ajzen, 1975). An individual forms an attitude based on learned values and beliefs generally over a long period of time (Asiegbu, Powei, & Iruka, 2012; Fishbein & Ajzen, 1975). Due to the length of time it takes an attitude to form, they are generally ingrained, and therefore, consistent and highly resistant to change (Asiegbu et al., 2012; Krech et al., 1962).

Consumer attitudes have been identified as one of the most important determinants of food waste, especially in developed countries where people can afford to waste food (FAO, 2013). Negligence

towards food waste is also heightened by the abundance of food available, mixed with declining food prices (Gustavsson et al., 2011; Stefan et al., 2013). Throughout the literature it is noted that attitudes are heavily influenced by moral norms and consumer values (Bolton & Alba, 2012; Lyndhurst, 2007; Evans, 2012; Stancu et al., 2016; Stefan et al., 2013). Research has found that consumers can develop negative attitudes towards food waste when they engage in wasteful behaviours as it can make them feel guilty about wasting food (Bolton & Alba, 2012; Evans, 2012; Neff et al., 2015; Stefan et al., 2013). In a study by Neff et al. (2015) it was found that a majority of US consumers (52%) reported negative attitudes towards food waste, stating that discarding food ‘bothered them a lot’. However, in contrast, a study in the European Union found that although only 7% of consumers were not bothered by the amount of household food waste they created, the majority still made no effort to reduce their level of waste. This was due to 41% of respondents believing that it was the responsibility of product producers to reduce waste, not theirs (European Commission, 2014). Furthermore, it has been found that consumers generally show concern for the amount of food they waste because they see it as a waste of money, rather than because of its negative environmental consequences (Lyndhurst, 2007; Neff et al., 2015; Stancu et al., 2016).

Further research has found that despite having negative attitudes towards food waste, consumers typically have positive attitudes towards sustainability and the idea of food waste reduction. Results have revealed that many consumers already possess a positive stance towards sustainability and food waste interventions and are therefore generally receptive to waste prevention activities (Neff et al., 2015; Stancu et al., 2016; Stefan et al., 2013; Whitehair et al., 2013). Therefore, Whitehair et al. (2013) believe that for the majority of consumers, reducing food waste may be a case not just of attitude, but instead, of finding a way to encourage consumers to act on their attitudes.

2.3.1.1 *Visceral Factors*

Attitudes are further influenced by visceral factors. Visceral factors include deep rooted and repeated judgements, such as emotions, hunger, values and habits, and also play a significant role

in motivating food decisions (Loewenstein, 1996; Setti, Banchelli, Falasconi, Segre & Vittuari, 2018; Verplanken, Aarts, van Knippenberg & Moonen, 1998). Factors such as convenience; habitual behaviour; diet and health concerns; perceived value for money; lifestyle; cultural upbringing; experience; and social norms heavily motivate people's purchase and consumption behaviours (Ganglbauer, Fitzpatrick & Comber, 2013; Vermeir & Verbeke, 2006).

2.3.2 Food Waste-related Behaviours

Although there are increasing numbers of consumers who are conscious of discarding edible food due to guilt, loss of money, and concern for the environment (Chen, 2019), there is also an extensive list of food waste-related behaviours that lead consumers to waste food. Due to food waste being generated in many different ways, it is not based on a single behaviour but is rather the result of multiple behaviours. These behaviours are critical components of the food provisioning process, and ultimately control the amount of food waste an individual creates (Jensen et al., 2012; Stancu et al., 2016). One of the most significant aspects of this process is an individual's ability to balance the amount of food purchased and the amount that is consumed, which is usually built around their day-to-day activities. Therefore, due to the repetitive nature of food-related behaviours, they are often routine, especially when it comes to planning practices such as meal planning, inventory checking, and use, or non-use of shopping lists (Evans, 2012; Stancu et al., 2016; Stefan et al., 2013).

Consumer food waste can be categorised into two behavioural routes: intentional food waste and routine food waste (Stancu et al., 2016; Stefan et al., 2013). Intentional food waste is predominantly influenced by attitudes and social norms whereas routine food waste is primarily influenced by perceived behavioural control and food related behavioural routines (Stancu et al., 2016). However, research has found evidence to support the claim that food waste is more dependent on a consumer's established behaviours and routines rather than their intentions to create food waste (Stefan et al., 2013). This is due to the idea that intention may not always transfer into behaviour, but instead, be affected by an individual's ability and willingness to perform specific food-waste related behaviours (Stancu et al., 2016; Stefan et al., 2013).

Throughout the literature, individuals have been found to create larger amounts of avoidable food waste when they possess particular food waste-related behaviours. These include the over-buying and/or over-cooking of food; failure to plan meals in advance; neglecting to use or follow a shopping list; omitting to carry out a food inventory prior to shopping; impulse purchases; and, finally, throwing away food according to its sell-by or best-before date (Cox & Downing, 2007; Doron, 2012; Exodus, 2007; Farr-Wharton, Foth & Choi, 2014; Graham-Rowe, Jessop, & Sparks, 2014; Griffin, Sobal & Lyson, 2009; Nikolaus, Nickols-Richardson & Ellison, 2018; Principato, Secondi & Pratesi, 2015; Stefan, van Herpen, Tudoran & Lähteenmäki, 2013). Graham-Rowe et al. (2014) argue that these negative behaviours are not necessarily due to an individual's thoughtlessness but rather the social and material pressures and conditions present when food is involved. This is due to food serving as one of the most inherent components of human social life, through co-constituting social order; building relationships and identities; and shaping human action (Bourdieu, 1984; Lévi-Strauss, 1969; Sosna, Brunclíková & Galeta, 2019). Neff, Spiker and Truant (2015) also consider that consumers may be unaware that they possess these behaviours. They may instead be ingrained in their rational thought processes and implicit, unconscious and habitual attitudes and behaviours. For example, overstocking contributes to households wasting an estimated 14% of their meat, grain, fruit, and vegetable purchases (Chandon & Wansink, 2006). Despite the list of different behaviours, there are three key behaviours which have been identified throughout the literature as the largest contributors to food waste. These behaviours include meal planning and shopping habits; leftover use and storage habits; and the use of date labels. Each of these are discussed, in turn, below.

2.3.2.1 *Meal Planning and Shopping Habits*

Meal planning and shopping habits have been found to be key determinants of consumer food waste due to the routine nature of the behaviours (Neff et al., 2015; NSW EPA, 2012; Pearson et al., 2013; Quested et al., 2013; Stancu et al., 2016; Stefan et al., 2013; Sustainability Victoria, 2011). A study by Stefan et al. (2013) found that planning and shopping routines have the largest influence on food waste. In particular, price-driven shopping habits have been identified as significant drivers of household food waste as they often prompt consumers to purchase more than

they need (European Commission, 2014; Evans, 2012; Neff et al., 2015; NSW, 2012; Pearson et al., 2013; Sustainability Victoria, 2011). Furthermore, it is now easier than ever for consumers to over purchase due to increased availability of larger packaging options and retail sales (Gustavsson et al., 2011).

Research has identified that many individuals neglect to use shopping lists. One study found that very few people stated that they used a shopping list (37%), with those aged 18-24 even less likely (28%) (NSW EPA, 2012). This type of behaviour can not only lead to unplanned purchases and overbuying but also to the over preparation of food which has been found to be one of the main drivers of household food waste (Aschemann-Witzel et al., 2015; Neff et al., 2015; Pearson et al., 2013; Quested et al., 2013; Stancu et al., 2016; Sustainability Victoria, 2011). Further findings from the NSW EPA (2012) study found that only 21% of respondents believed they cooked in the correct amounts or portion sizes with only 11% of those aged 18-24 stating they did.

Research has found that the key drivers for over purchasing includes individuals thinking they need more food than they actually do, a lack of engagement in planning routines and inventory checking; supermarket specials; and not carefully selecting foods that they know will be used (NSW EPA, 2012). However, one of the most common factors found in the literature influenced by meal planning and shopping habits is the concept of over-purchasing in order to be a ‘good’ provider (Evans, 2011; Evans, 2012; Graham-Rowe, Jessop & Sparks, 2014). This factor is linked to the behaviour of over-purchasing, or over-cooking with the desire to be a ‘good’ parent, ‘good’ partner, or ‘good’ host (Visschers, Wickli & Siegrist, 2016). The behaviour is also motivated by an individual’s high uncertainty levels and the desire to minimise inconveniences such as running out of a certain food or not having something to provide for family or guests (Graham-Rowe, Jessop & Sparks, 2014).

Furthermore, and more importantly, a significant motivation for consumers to over purchase food products comes from the marketing, sale strategies and promotions made by food corporations (Mondéjar-Jiménez, Ferrari, Secondi & Principato, 2016; Principato, Secondi & Pratesi, 2015). These strategies typically encourage consumers to buy food they do not need (Kumar, 2015;

Wansink, 2018). This is either purchased and never prepared; prepared and never served; or served and never eaten (Wansink, 2018).

2.3.2.2 *Leftover Use and Storage Habits*

A 2012 study by the New South Wales Environment Protection Authority (NSW EPA) found that of the 6.7 litres of average food waste discarded from households each week, leftovers were the second highest category in terms of volume, 1.7 litres, second to fresh food, 2.5 litres. Neff et al. (2015) found that there are many factors that drive consumers to discard leftovers, however, the most common are the risk of foodborne illness and the desire to eat only the freshest foods. However, in contrast, Kantor et al. (1997) found that the majority of food waste comes from food that has been forgotten about and expired in the refrigerator or pantry.

Another issue which has been identified in relation to food waste behaviour is a lack of knowledge on proper storage habits and inadequate cooking skills for leftover use (NSW, 2012; Stancu et al., 2016; Stefan et al., 2013). Further findings from the NSW EPA (2012) study found that one-third of respondents reported that sometimes they discarded leftovers immediately after a meal. Moreover, a large group of participants also stated that they often saved leftovers in the fridge or freezer only to dispose of them later (NSW EPA, 2012). These behaviours may be due to factors such as the perceived value of food, and time-poorness in many households. The combination of these elements can lead to a stockpiling storage behaviour. This occurs when items in the fridge continuously get pushed to the back to a point where they are no longer easily visible and are therefore forgotten about until a spring clean of the fridge occurs (Farr-Wharton, 2014).

2.3.2.3 *Date Labels*

Consumers often use date labels to make decisions on when to discard food (Aschemann-Witzel, 2015). However, it is apparent in the literature that an underlying reason for creating food waste is the inability to read and understand ‘best before’ dates on food (Bravi, Murmura, Savelli & Viganò, 2019; European Union, 2015; Graham-Rowe, Jessop & Sparks, 2014; Mirghotbi & Pourvali, 2013; Neff, Spiker, Rice, Schklair, Greenberg & Leib, 2019; Setti, Banchelli, Falasconi,

Segre & Vittuari, 2018). In New Zealand, it is a legal requirement that all packaged food with a shelf life less than two years be labelled with a date marking, which is usually a 'use-by' or 'best-before' date (Ministry for Primary Industries, 2019). Møller (2016) describes best-before dates as relating primarily to the food quality rather than to food safety, and therefore, it is the time period in which the producer expects a product to retain its original condition in unopened packaging. After this date the food item may still be an acceptable quality for a long period of time, however, the producer no longer holds any legal responsibility for the quality of the food. In contrast, use-by dates relate instead to food safety (Møller, 2016). Use-by dates are typically used on highly perishable foods where the storage time may lead to immediate danger to health regardless of whether the item is stored at the specified conditions. After this date the item is considered unsafe to consume (Møller, 2016).

According to the European Union, only one-third of consumers have the ability to comprehend the meaning of the 'best before' date (European Union, 2015). Many consumers do not understand that this date is related to quality, and foods can often be consumed safely after this date (Monier, 2010; Van Boxstael, Devlieghere, Berkvens, Vermeulen & Uyttendaele, 2014). Even when considering both of these dates, the durability of food items can change after the package has been opened. This can therefore lead to confusion and difficulty for consumers when determining how long they can use a specific item for (Møller, 2016). Graham-Rowe, Jessop and Sparks (2014) argue that this motivation is also related to an individual's knowledge of food storage and food hygiene safety and the anxieties surrounding consuming food that could poison the individual or their family or friends. In this situation, many individuals would rather throw away food than put themselves, or others, at risk (Exodus, 2007). In a study by Qi and Roe (2016), 70% of respondents believed that discarding foods past their labelled date reduces the odds of foodborne illness, while 37% of respondents usually or always discarded food that was close to or past the label date, and that 84% of respondents did so at least occasionally.

2.4 YOUNG ADULTS AND FOOD WASTE

Young adults have been found to be the portion of the population most inclined to waste food and are therefore one of the largest sources of preventable food waste (Bravi, Murmura, Savelli & Viganò, 2019; Nikolaus et al., 2018). Thyberg and Tonjes (2016) found that 38% of 18-24 year olds in Australia wasted more than \$30AUD on food every two weeks, compared to only 7% of those aged 70+. Nikolaus et al. (2018) claim that this is due to their heightened spontaneity levels, desire for convenience and their limited food management experience. Moreover, food is now more affordable than ever due to industrial commodification. Therefore, people, especially younger generations, are not as concerned about consuming all the food they purchase before it expires and often throw away unconsumed goods adding to food waste (Thyberg & Tonjes, 2016).

Furthermore, a study by the European Commission (2014) found that consumers aged 15-24 years have the highest amount of self-reported food waste, with 37% reporting that they are likely to waste 6-15% of the food they purchase and 13% saying they likely wasted 16-30% of food purchased (European Commission, 2014). Consequently, consumers in the 15-24 year age group were found to be wasting the highest amount of waste in financial terms with an average of \$26 worth of food each week compared to the average of \$19.90 (NSW EPA, 2012).

Date labels were identified as one of the biggest influences on wasting food for consumers aged 18-24 (NSW EPA, 2012). This is because they were found to be less likely to understand the meaning of the date labels than older consumers and were more likely to view all labels as food safety indicators (Boxstael et al., 2014). Therefore, this group is more likely to discard foods that have passed best before dates without checking the quality of the item (Boxstael et al., 2014; NSW EPA, 2012). A further influence on young adult's food wasting behaviours includes difficulties related to leftover use with only 63% of those aged 18-24 indicating that using leftover ingredients was easy compared to 76% of overall respondents (NSW EPA, 2012).

There has recently been a shift in attitudes and behaviours towards food purchases, consumption and waste, especially from younger consumers. A study by Rezai, Teng, Mohamed and Shamsudin

(2012), highlighted a behaviour change by young consumers in terms of their food purchases and consumption due to the desire for more healthy, nutritious, convenient, and safe foods. Additionally, younger generations are now seeking further food safety and health education (Unusan, 2007), and also have a desire for sustainability and nutrition over cost and convenience (Allen & Spialek, 2018; Mahler, 2015). However, despite these findings there have been no focused interventions or further study, especially in New Zealand, directed at this group and their food waste habits.

2.5 APPROACHES USED TO STUDY FOOD WASTE

Current data on household food waste has primarily come from two main sources; localised rubbish bin audits and consumer surveys (Lehmann, 2015). However, quantifying the amount of household food waste produced proves difficult as people can use alternate means of disposal of food waste, including composting, worm farm and chickens or other pets, and often people do not use consistent approaches. Furthermore, although these methods have provided some extremely valuable data, when participating in consumer surveys, as well as interviews and focus groups which are also regularly used, people tend to underestimate the true amount of food waste they create (Lehmann, 2015). Moreover, McTaggart (2015) found that using contemporary archaeological methods over a period of time can provide actual data on what and how much people waste. This is due to socially undesirable behaviours, such as alcohol consumption, being significantly higher in reality than results found through use of questionnaires, therefore highlighting the difference between people's self-reported and actual behaviours (Lehmann, 2015).

2.5.1 Approaches Used to Study Young Adults and Food Waste

Previous food waste studies aimed at young adults have used a variety of qualitative and quantitative methods for research. However, there has been a strong focus on qualitative studies which exploit reported behaviour rather than actual behaviour. For example, Nikolaus et al. (2018) ran focus groups with 58 individuals. These were designed to determine young adults, in the United

States, perceptions, beliefs and behaviours surrounding food waste through identification of themes within the transcripts. Similarly, Bravi, Murmura, Savelli and Viganò (2019) and Rezai, Teng, Mohamed and Shamsudin (2012) used online surveys in order to identify the motivations and actions among young consumers in Italy and Malaysia, respectively.

In comparison, Mallinson, Russell and Barker (2016) used a quantitative approach in order to determine whether young consumers' creation of household food waste is linked to a lifestyle reliant on convenience food. They tested this theory through an online questionnaire which had responses from 928 UK residents aged 18-40 years. The questionnaire was designed to measure attitudes towards convenience food and to quantify household waste (Mallinson, Russell & Barker, 2016). By focusing on reported behaviour, these four studies neglected to note the link between what is purchased and what is discarded and the reasons for this link.

Roodhuyzen, Luning, Fogliano and Steenbekkers (2017) highlight the heterogeneity and ambiguity associated with food waste research. This is due to the variety of approaches, categories, measuring methods and ways of presentation present in the domain. Therefore, comparing and contrasting food waste studies is not a straight-forward endeavour and transferring findings from one context to another can be problematic. Moreover, Xue et al. (2017) examined 202 papers on food waste losses from around the world and found high uncertainties in existing global research and databases within the food waste domain.

2.5.2 Approaches Used in New Zealand to Study Food Waste

New Zealand has very little literature on waste, especially in the food waste category (Reynolds, Miroso & Clothier, 2016). Before 2014 there was a handful of government and media reports which discussed food waste (Davidson & Johnston, 2011; Ministry for the Environment, 2009; Ministry for the Environment, 2010; Statistics New Zealand, 2009), an audit of hospital food waste (Goonan, Miroso & Spence, 2014), a master's thesis which investigated household food waste utilising an intervention case study (Parr, 2013), a literature review conducted by the Waiheke Resources Trust (Waiheke Resources Trust, 2009), and a consulting report for WasteMINZ (Yates,

2013). In 2015, WasteMINZ carried out an extensive food waste study consisting of food waste audits, surveys and kitchen diaries (Love Food Hate Waste NZ, 2019; WasteMINZ, 2019b). This study appeared to be a turning point in the study of food waste in New Zealand as it was followed by the launch of the Love Food Hate Waste campaign in 2016; a report which estimated the tonnes, value, calories and resources wasted in New Zealand through the use of macro-economic data and aggregated waste data (Reynolds, Miroso & Clothier, 2016); and two further masters theses which studied food waste in restaurants and cafes in New Zealand utilised online questionnaires' (Chisnall, 2017; Jones, 2017).

New Zealand Parliament's Environment Select Committee is in the process of carrying out an informal briefing to look into ways to prevent food waste in New Zealand. Learning is the focus of this inquiry in order to help the committee better understand the issues and to develop recommendations for future action (New Zealand Parliament, 2018). The inquiry started in August 2018 and although there have been 36 published submissions, to date there have been no recommendations or publications made regarding the findings (New Zealand Parliament, 2019). There have also been no further identified studies on food waste in New Zealand that specifically focus on young adults.

2.6 GAPS IN THE LITERATURE

2.6.1 Identified Research Gap 1

Young adults have been identified as a group susceptible to the creation of excessive food waste however they are rarely studied (Bravi, Murmura, Savelli & Viganò, 2019; Clayton, 2017). Young adults living in a flatting situation have been previously excluded from research, despite being one of the largest contributors to food waste. Therefore, the sorts of foods they waste; how they dispose of their food waste; and the factors that lead them to create food waste have yet to be explored. Leblanc (2019) argues that millennials are not as 'green' as many people would believe and after moving out of home they are less likely to have sound rubbish and recycling practices in place in

comparison to their parents. Therefore, the first identified research gap is tertiary students living in student flats.

2.6.2 Identified Research Gap 2

Researchers, especially in New Zealand, typically focus on reported behaviour rather than actual behaviour when it comes to food waste studies. Therefore, the second identified research gap is an ethnographic study utilising garbology. Damron-Martinez and Jackson (2017) state that garbology has a long history, with archaeologists acquiring great insights into ancient cultures from their waste. Studies by Reilly and Wallendorf (1987), Belk, Fischer and Kozinets (2012), and Cote, McCullough and Reilly (1985), were able to exploit garbology to analyse consumption patterns of different groups and to note the consumer behaviour-intention gap between a stated goal and subsequent behaviour. This can be transferred directly into the proposed study as a way to analyse the missing link between what is purchased and what is discarded. Furthermore, the research method will create an opportunity to explore the sorts of foods that are being wasted, whether these foods are being disposed of correctly and finally the factors that lead individuals to waste food.

2.7 CONCLUSION

This chapter offers key contributions to the current literature on food waste, especially that on young adults in New Zealand. With attention towards this issue rising, this research is more relevant than ever. This chapter provided a review of the literature relevant to this study, discussing a number of food waste-related topics. The major influence for this chapter was the deleterious truth that over one-third of the food produced throughout the world is wasted each year, with New Zealand households producing an estimated \$872 million worth per annum. The problem was therefore explored through firstly defining and classifying the key terms: food waste, avoidable, possibly avoidable, and unavoidable food waste; and secondly through the exploration of food waste in New Zealand, the food supply chain, food waste disposal methods, the environmental, social and economic impacts of food waste, and lastly the concept of consumer food waste specifically that produced within the household. The next section identified the factors that lead to

food waste including attitudes and key food waste-related behaviours. This was followed by a review of the literature on young adults and food waste and then on the approaches used to study food waste, with special attention to those studies which involve young adults. Lastly, through connecting different streams of the literature, key gaps in the literature were presented.

3. METHODOLOGY

3.1 INTRODUCTION

In this chapter a comprehensive description of the methodology used in the study is provided. The chapter is separated into four sections. The first section describes the purpose of the research and the motivations behind the study. This is followed by the research philosophy which includes the epistemological and theoretical perspectives as well as the corresponding assumptions. Next, the method is outlined consisting of a description of the setting; the process used for identifying participants and sampling; the research objectives; the research design comprising of the four stages of research (participant observation, qualitative interviews, fridge ethnography, and garbology), as well as the data analysis techniques used and the limitations for each stage. The final section summarises the ethical considerations and the preventative steps taken to protect respondents.

Due to the complex nature of the research design, this chapter is developed in a descriptive manner with the aim of guiding the reader through each step of the research process.

3.2 RESEARCH PURPOSE

The research gaps found from the literature review showed that there are areas within the food wastage literature that are yet to be explored, especially in a New Zealand context. Therefore, the aim of this research project is to explore how tertiary students living in independent living situations deal with food waste in order to create a foundation for reducing overall food waste created by tertiary students. The researcher believed that in order to gain the most reliable and effective data an ethnographic study should be utilised to aid in reporting on actual behaviours rather than self-reported behaviour. The construction of the components of the study, selection process, treatment and measurement, are presented and described in-depth in the following sections.

Christchurch has been selected as the focus of the study as it is unique in providing a kerbside organics collection, which enables residents to easily compost their food and garden waste. Three bins are provided by the Christchurch City Council for rubbish; recyclables; and compostable food and garden waste. These bins are provided for all households, including student flats.

3.3 RESEARCH PHILOSOPHY

The following section will address the epistemological beliefs and the theoretical approach of the researcher (as per Hudson and Ozanne, 1998). Specifying the epistemological and theoretical perspectives used in this study are crucial due to the focus of this study being humans and understanding the factors that shape their behaviour.

Utilising an ethnographic study will help to understand how food waste behaviours are affected by context and therefore help to recognise that reality is a product of human intelligence interacting with experience in the real world (Dudovskiy, 2019).

3.3.1 Epistemology

The researcher has taken a constructionist position and therefore attempts to make sense of reality (Allen, 2017). Crotty (1998 pg. 43) describes constructionism as “the view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context.” Therefore, within the constructionist view, human beings ascribe meaning to objects as they engage with the world they are interpreting. In other words, meaning is not created or discovered but rather constructed. Furthermore, all objects hold potential for meaning, however, actual meaning only emerges once an object engages with consciousness (Crotty, 1998).

Constructivism focuses on meaning and the constructing of social and psychological worlds through individual, cognitive processes. Consequently, social, historical, and cultural contexts

construct meaning through action and discourse in which people form relationships and community (Young & Collin, 2004). In relation to this particular study, a guiding idea is that food waste behaviours are ingrained in an individual's culture, but at the same time people created that same culture. Furthermore, from the constructivist viewpoint there are no "perfectly applicable solutions" (Bryman & Bell, 2015 pg. 21) to the food waste issue. Therefore, any potential solution must be adapted to the individual's cultural and social setting.

3.3.2 Theoretical Perspective

The perspective that is taken by the researcher is that the human mind is extremely complex and therefore people experience and interpret reality in different ways. Therefore, an interpretivist perspective is taken. Crotty (1998) describes interpretivism as an approach which attempts to understand and explain human and social reality. Therefore, interpretivists look for culturally derived and historically situated interpretations of the social life-world. Furthermore, each researcher enters a setting, or research environment, with some pre-understanding and a general plan. However, despite this, the interpretivist researcher attempts to be open to new information, as the study unfolds with assistance from informants. This is because existing and perceived realities are time and context bound (Hudson & Ozanne, 1988).

3.3.2.1 *Ontological Assumptions*

All research approaches make ontological assumptions about the nature of reality and social beings. With regard to the nature of reality from the interpretivist viewpoint, one real world does not exist, therefore, reality is essentially mental and perceived. Consequently, individuals use devices, such as theories, to help make sense of their world (Hudson & Ozanne, 1988). Furthermore, multiple realities exist, and are constantly changing, due to the different perspectives of individuals and groups. Therefore, it is vital for the researcher to understand the context of a behaviour because social beings construct reality and give it meaning based on context (Lincoln & Guba, 1985). The participant observation technique is, therefore, used in this study to allow observation of individuals in their natural context as well as to provide a holistic view. Furthermore, although it is impossible to truly see the world through the eyes of another,

researchers attempt to study individuals according to their own perspectives rather than those of the researcher (Taylor & Bogdan, 1984). Studying the phenomena holistically also helps the researcher to describe multiple realities as interpretivists do not believe a single reality exists (Hudson & Ozanne, 1988).

In terms of the nature of social beings, interpretivists see people as voluntaristic and therefore they create meaning through their interactions with the world (Blumer, 1969). Consequently, individuals are not merely acted upon by outside influences, but instead, actively create and interact in order to shape their environment (Hudson & Ozanne, 1988).

3.3.2.2 *Axiological Assumptions*

Axiologies, also known as fundamental goals, hold great importance for the interpretivist researcher (Hudson & Ozanne, 1988). From the interpretivist perspective the primary goal of research is to understand particular behaviours, rather than predict them (Rubinstein, 1981). Gaining an understanding is a never ending process by which interpretations made by the researcher enter into current interpretations, which influence future interpretations, and so on. Consequently, a researcher never achieves ‘the’ understanding, only ‘an’ understanding (Denzin, 1984). *Verstehen*, a German word which means to ‘understand in a deep way’, is a prerequisite for doing research and seeking understanding (Hudson & Ozanne, 1988). This approach, which falls into the interpretivist view, sees the researcher attempt to put themselves in the informant’s shoes, or see the phenomena from their perspective. In doing so, they seek to grasp the shared meanings within a culture including that of language, contexts, roles, rituals, gestures and arts (Wax, 1967). As a great deal of research is conducted within the researcher’s own culture, a high degree of *Verstehen* already exists. Consequently, shared meanings can be taken for granted and research questions can oftentimes be constructed from the perspective of the researchers own culture (Hudson & Ozanne, 1988).

3.3.2.3 *Epistemological Assumptions*

Epistemological assumptions include knowledge generated, view of causality and the research relationship. From the interpretivist point of view, knowledge is generated from studying a specific phenomenon in a particular place and time, therefore, taking a historical, particularistic approach to research (Hudson & Ozanne, 1988). Furthermore, the researcher attempts to articulate motives, meanings, reasons and other subjective experiences that are both time, and context, bound (Hudson & Ozanne, 1988). Consequently, the particulars of a phenomena are of fundamental importance and therefore the research seeks to focus on as many details as possible, achieving a thicker overall description.

In terms of the view of causality, the interpretivist researcher holds the view that it is impossible to distinguish cause from effect due to the world being so complex and constantly changing (Lincoln & Guba, 1985; Rubinstein, 1981). Therefore, they view the world holistically with mutual, simultaneous shaping occurring between entities. Consequently, if a researcher attempts to fragment reality, it will then change as reality is not comprised of parts of facts (Rist, 1977).

Finally, the research relationship held by the interpretivist is that people being studied interact with one another, forming a cooperative inquiry (Reason & Rowan, 1981). This comes from the viewpoint that social reality is based on individuals' or groups' perceptions, and therefore, in order to gain an understanding of these perceptions, the specific individuals need to be involved in developing the research design (Hudson & Ozanne, 1988). Therefore, the research design emerges throughout the process as it adapts with not only the researcher but the informants as well (Hudson & Ozanne, 1988). The use of a typically unstructured research technique, such as participant observation, allows the researcher in this study to take lead from the informant, who not only informs, but also guides the research (Hudson & Ozanne, 1988). Furthermore, through the use of face-to-face interviews, and the observation of participants in their natural environment, the objective of this study is to gain an empathetic understanding of why participants behave in a particular way (Bryman & Bell, 2015). This "empathetic understanding" is comparable to the *Verstehen* approach, discussed above. In this situation the researcher is more interested in the

social action itself as seen through the eyes of a person rather than external forces which have no meaning for those involved in that social action (Crotty, 1998). Furthermore, the data has been collected through personal methods such as face-to-face interviews, as this method allows the researcher to go off script, allowing for direct observation of body language and reactions which can help to gain more subjective data when needed.

3.4 METHOD

An ethnographic study, a systematic approach to research where the researcher is the primary source of data collection (LeCompte & Schensul, 2010), was selected to explore the research goals. The study was designed to capture a sense of actual behaviour rather than reported behaviour. This was a highly influential consideration when constructing the research design as being seen to be environmentally friendly is becoming more socially desirable, and therefore, it is likely to result in more consciously reported waste behaviours (Lehmann, 2015). Ethnographic studies, sometimes referred to as fieldwork or field research, have been praised for their ability to draw researchers out from behind their desks by encouraging them to intentionally immerse themselves in the worlds of those they are studying (Schwartz-Shea, & Majic, 2017). The research stream first came about within anthropology, however, it is now prominent in a range of fields (DeLyser et al., 2010). A wide range of methods and techniques are utilised by ethnographers when conducting their research. These include, but are not limited to: participant observation; taking field notes and memos; gathering visual, material and documentary materials; asking individuals to describe their everyday world; and conducting in-depth to semi-structured interviews (DeLyser et al., 2010). Therefore, the study not only included immersion within the flatting situation of each participant, but was also complimented by qualitative, semi-structured interviews, fridge ethnography, and garbology. The overall goal of these approaches was to determine the missing link between what is purchased and what is discarded by students living in student flats and the factors and behaviours which influence these decisions.

3.4.1 Research Objectives

The research design was formed with consideration of the following research goals:

1. To determine what sorts of food are being wasted among tertiary students living in independent living situations (student flats) in Christchurch.
2. To determine whether food is being properly disposed of (composted) by tertiary students living in student flats in Christchurch.
3. To determine the factors that lead to food wastage among tertiary students living in student flats in Christchurch.

3.4.2 Setting

The study was conducted in Christchurch, New Zealand. There are three main tertiary providers in the city: the University of Canterbury, Lincoln University and Ara Institute of Technology. Those students that participated in the study were, at the time of writing, enrolled to study at one of these three tertiary providers.

Christchurch is also unique in providing residents with a weekly kerbside organics waste collection (Christchurch City Council, 2019a). Therefore, participants have the ability to easily compost their food waste through the provision of a separate green bin.

3.4.3 Participants and Sampling

Participants were eligible to participate in the study if they met the following criteria:

- a) Tertiary student, over 18 years old
- b) Residing in an independent living situation (student flat)
- c) Responsible for some portion of the grocery shopping and meal preparation

A further condition was that all participants needed to live in different student flats in Christchurch to ensure there was no crossover of data when inspecting food waste processes used by tertiary students. An equal divide between male, female, and mixed gender student flats, was also desired.

These criteria were based on the literature review which showed that young adults were found to be the portion of the population most inclined to waste food and are therefore one of the largest sources of preventable food waste (Bravi et al., 2019; Nikolaus et al., 2018).

Sampling, a crucial step in analysis, is defined as the process of “taking a smaller chunk of a larger universe” (Miles & Huberman, 1994 pg. 31). In this study, non-probability convenience sampling was used where a sample is drawn from the population that is close to hand (Frey, 2018). Gaining access to participants was achieved with the use of advertising. A Facebook post was made on the USCA (University of Canterbury Student Association) page reading:

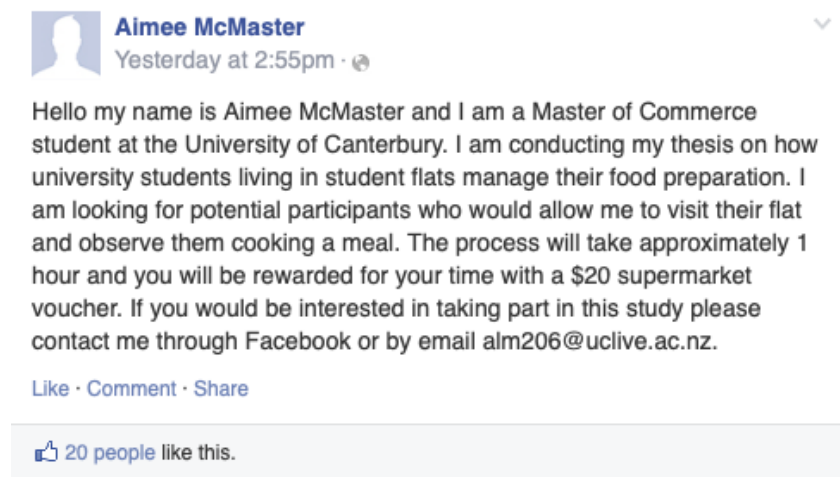


Figure 3.1: Facebook Advertisement

This approach allowed students to ‘opt-in’ to the study and express interest rather than using other potential methods such as a snowballing approach where identified members of the population are asked to identify other members of the population and so on until the desired sample is obtained (Thompson, 2012). This method was considered but was not used due to the potential of making

people feel as though they were being pressured to participate in the study. An inducement in the form of a \$20 supermarket voucher was offered to participants.

Strauss and Corbin (1998) describe the notion of sampling as cumulative, and therefore, it can evolve throughout the sampling process. Consequently, the sample size is not predetermined but rather each new interviewee helps to provide new data on which information is built upon until data saturation is reached (Njite, Hancer, & Slevitch, 2011). Therefore, the sample size for qualitative data collection varies greatly and instead relies on data saturation (Glasser & Strauss, 1967; Goulding, 2002; Strauss & Corbin, 1998). Based on findings from the literature, saturation generally occurs between 10 and 30 participants, however in some cases it is achieved in less than ten (Guest, Bruce, & Johnson, 2006). Data saturation occurs when no new categories, concepts, dimensions or incidents emerge during the research process, and therefore, no further learning is achieved (Fusch & Ness, 2015). In the study this point was reached after 19 participants.

3.4.4 Research Design

The following section will provide an outline of the data collection techniques utilised in this study. The data analysis approach used for each technique, as well as the limitations of each data collection technique, will also be discussed in turn.

This study utilises qualitative research as the goal is to understand the nature of the phenomena, rather than the magnitude and distribution of it (DeWalt & DeWalt, 2011). The complete process took approximately one hour of each participants time, with research carried out between the months of October and December 2019. The aim was for the observation to be as informal as possible, therefore allowing participants to feel as relaxed and comfortable as possible in their own homes despite a researcher being present. This was desired in order to observe natural and regular behaviours and actions.

Participants were provided with information, before they agreed to participate, on what was required of them (See Appendix 7.1 – Information Sheet). However, there was a level of deception

at the beginning of each study. This was necessary as a more covert approach was desired in order to minimise changes in usual behaviour due to observation and ensure that the data gathered was reliable (LeCompte & Schensul, 2010). The deception came from not fully declaring the interest of the study and instead indicating to participants that the study was centred around ‘food preparation’. The aim of this was to see how participants actually manage their food waste, rather than asking them directly about their food waste. The researcher believed that this approach would reduce potential bias as well as the likelihood of receiving socially desirable responses rather than actual practices.

3.4.4.1 *Stage One: Participant Observation*

Firstly, participant observation was utilised to help determine Research Objectives One and Two (e.g. what sorts of food are being wasted and/or composted). Participant observation is an appropriate methodology for studies of almost every aspect of human existence (Jorgensen, 1989). DeWalt and DeWalt (2011 pg. 12) define participant observation as “a method in which a researcher takes part in the daily activities, rituals, interactions, and events of a group of people as one of the means of learning the explicit and tacit aspects of their life routines and their culture”. Furthermore, participant observation is seen to be the starting point in ethnographic research (Schensul, Schensul & LeCompte, 1999), with the aim of generating practical and theoretical truths about human life found within the realities of human existence (Jorgensen, 1989). The main factors of participant observation include using everyday conversation as an interview technique; informally observing during leisure activities (i.e. hanging out; recording observations in field notes, usually chronologically); and using both tacit (aspects that remain outside awareness or consciousness) and explicit (part of what people are able to articulate about themselves) information in analysis and writing (DeWalt & DeWalt, 2011). Jorgensen (1989) stated that participant observation is most appropriate when: the phenomenon of investigation is observable within an everyday life situation or setting; the researcher is able to gain access to an appropriate setting; and the research problem can be addressed by qualitative data gathered by direct observation and other means pertinent to the field setting. Ultimately, participant observation

provides data to describe what goes on, who or what is involved, when and where things happen, how they occur, and why things happen as they do in particular situations (Jorgensen, 1989).

In order to observe waste practices, participants were asked to perform their 'everyday' meal preparation routine in their flat, which took between 30 minutes to an hour for preparation and cooking. Each participant was observed completing these tasks. The researcher attempted to not judge or influence the participants in any way while they completed these tasks. Note-taking occurred throughout the observation on factors such as: how much food waste was created throughout the process; the types of foods that were being wasted; and how the participant managed the food waste they created. This technique also allowed for direct observation of the types of food that were being thrown away and the waste disposal methods which were in place within the flat.

After the observation of the meal preparation and cooking was completed the participants were given a debrief sheet in order to disclose the true purpose of the study (See Appendix 7.2 – Disclosure Statement). At this point, participants were given the option to withdraw any information gathered from them so far with the confidence that any of the information would be destroyed immediately if they chose to withdraw from the study at this point.

3.4.4.1.1 Data Analysis - Participant Observation

In this stage the following information was recorded in field notes:

Stage 1: Participant Observation	
Start time:	i.e. 7.25pm
End time:	i.e. 7.55pm
Meal:	i.e. <i>Spaghetti Bolognese</i>
Ingredients used:	i.e. <i>Onion, mince, pasta sauce, beef stock, pasta, broccoli</i>
Waste created:	i.e. <i>Half an onion (put into fridge), onion skin and broccoli stalk (put into organics bin), half of pasta sauce (put back into fridge)</i>
Bins in kitchen	i.e. <i>Small organics bin (very full) → green bin Rubbish bin (very full) → red bin Recycling bin → yellow bin</i>

Table 3.1: Sample Participant Observation Form

These field notes allowed the researcher to determine the typical ingredients used by tertiary students when preparing dinner for themselves and their flat mates; how much food waste was being created during the preparation of a meal; and more importantly how the food waste was being managed. In particular, was food waste being put directly into the rubbish bin or did participants have a method to ensure the food waste going into the compost or green lidded bin for kerbside composting.

3.4.4.1.2 Limitations - Participant Observation

Although useful, participant observation as a technique does have some limitations. Most importantly, there is still the potential for some level of bias to be created purely from a researcher being present despite feeling comfortable in their own environment and with the researcher themselves. However, traditional methods such as interviews and focus groups have been found to generate a higher level of bias as individuals tend to underestimate their consumption habits

when they are freely volunteering information on these habits (Lehmann, 2015). In comparison, Damron-Martinez and Jackson (2017 pg. 153) are quoted as saying “garbage does not lie”, and therefore it can be used to the researcher’s advantage to source the most accurate data.

3.4.4.2 *Stage Two: Fridge Ethnography*

Fridge ethnography was utilised with the aim of determining Research Objectives One and Two (what food is wasted and/or composted). Fridge ethnography involves examining the contents of the participants fridge and was selected as part of the research design in order to provide insight into the connection between what is purchased and what is discarded (Damron-Martinez & Jackson, 2017). Fridge ethnography is a methodological tool designed to gain insight into food storage practices through the materials embedded within them, predominantly food, but also the kitchen infrastructure, technologies and products (de Jong & Mazé, 2017; Shove, 2007). The process is ethnographic in nature and involves taking an inventory of the contents of the refrigerator. This can be achieved through an unstructured ‘rummage’ through the refrigerator and other parts of the kitchen. The term rummage in this context refers to participation from both the researcher and the participant by standing together in the kitchen and talking about, touching and photographing the items present (Hebrok, & Heidenstrøm, 2019). Fridge ethnography has the ability to produce rich data consisting of the interconnectedness between what a participant says and reality (Hebrok, & Heidenstrøm, 2019). Furthermore, fridge studies have the capacity to facilitate storytelling about the food and why the food is wasted (Hitchings, 2012).

3.4.4.2.1 **Data Analysis - Fridge Ethnography**

A systematic approach was used in this stage of the research design. The household refrigerator was selected for analysis due to previous studies determining that this is where the majority of expired food waste is housed rather than the pantry or freezer (Farr-Wharton et al., 2014). The process took approximately ten minutes per participant. The researcher began the process by taking a photograph of the participant’s refrigerator and checking for any items that had passed their best-before or use-by dates. Next, all items were assessed on whether they looked fresh and edible or alternatively if any produce was looking ‘worse for wear’ or inedible i.e. fruits and vegetables that

were considerably mouldy or shriveled up. After this the researcher questioned the participants on how long leftovers or particular items had been in the refrigerator for and whether there was a plan for future use. An example of recorded information is presented below:

Stage 2: Fridge Ethnography	
Refrigeration and freezer space available:	i.e. 2 x Fridge/freezer (very full) 1 x Chest freezer
Notes:	i.e. Very full fridges, most vegetables look good except some starting to go a bit mouldy at the back of the fridge, some leftovers have been in the fridge for over 5 days, a few condiments have expired

Table 3.2: Sample Fridge Ethnography Form

These particular notes allowed the researcher to determine the storage options available to students living within the flat and if there was adequate space to store fresh foods in the refrigerator, as well as frozen items, such as leftovers, in the freezer. After notes were taken on the foods housed within the refrigerator the items found were divided into five categories: fruits and vegetables; dairy products; condiments; leftovers; and other. These sections allowed the researcher to see what types of food were most likely to spoil or pass their expiry date, and consequently go to waste, in student flats in Christchurch.

3.4.4.2.2 Limitations - Fridge Ethnography

One limitation to this research method was that in some circumstances it was found that members of the household had very recently, in the last one or two days, had a fridge ‘spring clean’. This was not necessarily in anticipation of the researchers visit, but rather for reasons such as the refrigerator becoming too full and in order to make room they had thrown away expired or moldy items. Therefore, assessing the same fridge, on multiple occasions, over a period of time, may have been able to produce more accurate results.

3.4.4.3 *Stage Three: Garbology*

Garbology is an applied science that analyses how humans create, and dispose of, waste (Cote et al., 1985; Rathje, 1996). The method started as a way to explore the archaeology of today and has developed into the study of contemporary remains as opposed to ancient ones (McTaggart, 2015). Typically, garbology involves landfill excavation with archaeological methods and techniques applied to the study of waste. It is often used as a way to verify public opinion polls conducted to determine waste creation and disposal in various urban and rural centres (McTaggart, 2015). McTaggart (2015) suggests that explorations of waste yield important insights regarding the cultures that produce it as our rubbish is constitutive of who we are. Furthermore, it is believed that if archaeologists are able to determine information about extinct societies from patterns in ancient rubbish, then they too can learn information about contemporary societies from patterns in fresh rubbish (Lehmann, 2015).

Data found through the garbology technique also differs greatly from self-report data which has been found to produce biases through socially desirable responding (Rathje, 1984). Instead, analysis of waste can produce empirical evidence through comparable food consumption data, and consequently, can help in determining not only better ways to deal with rubbish, but also ways to stop the creation of it in the first place (McTaggart, 2015). Therefore, garbology was selected as part of this study to address Research Objectives One and Two (i.e. the types of foods being wasted by tertiary students living in student flats and whether they are disposing of these foods properly).

3.4.4.3.1 **Data Analysis - Garbology**

More typically garbology focuses on landfills, however this study utilises the technique at a much smaller scale. Data was analysed through systematic analysis. Firstly, participants were asked if the researcher could go through their kitchen rubbish bins. In the circumstance where a participant was to decline, they were able to freely withdraw from the study at this point with no penalty. They also had the option to remove all other information gathered from them if they wished to do so. If, however, permission was granted, the process took approximately 15 minutes. This process involved taking the kitchen rubbish bin and, if present, the organics bin into the back garden and,

spreading the contents (separately) onto a tarpaulin. Using this process, the researcher was attempting to determine if food was put into the rubbish or whether food waste was put into the compost or organics bins. A tarpaulin was used to ensure that the contents was able to be visually examined with as little direct contact as possible. Once the rubbish was evenly spread, a photo was then taken of the rubbish and all food waste present was recorded. For example:

Stage 3: Garbology	
Kitchen Rubbish Bin:	<i>i.e. Raw chicken breast, raw piece of steak, cooked rice, teabags, lemon rind, half a cucumber, coffee grinds, banana skin</i>
Organics Bin: (Extremely full and overflowing)	<i>i.e. Egg shells, chicken bones, whole apple, broccoli stalk, 2 asparagus, 3 whole kiwi fruit, 3 whole bulbs of garlic, rest scraps</i>

Table 3.3: Sample Garbology Form

The notes taken at this stage of the research helped to gain an idea of the composition of unavoidable, avoidable, and possibly avoidable food waste found within both the red and green lidded Christchurch City Council bins. After the waste was examined the findings were categorised into the three different types of food waste.

3.4.4.3.2 Limitations - Garbology

Although effective for reducing biases in self-reported behaviours, waste analysis also has some limitations. These include the use of the household as the unit of observation, distortions introduced by other disposition means, and the lack of residue for some items which may not have been consumed in the home (Reilly & Wallendorf, 1987). Furthermore, limitations can arise from inferences drawn purely from behavioural data (Reilly & Wallendorf, 1987). However, combining all four stages of the research design helps to link causal inferences as the interviews help to provide explanations for the motivational and cognitive processes accompanying the behavioural patterns reflected in the waste analysis (Reilly & Wallendorf, 1987).

3.4.4.4 *Stage Four: Qualitative Interviews*

The final stage of the research design was semi-structured interviews. This process helps to illuminate patterns, concepts, categories, properties and dimensions of the phenomenon (Glaser & Strauss, 1967). Semi-structured interviews are known for being both versatile and flexible as the rigidity of the structure can vary depending on the purpose of the study and the research questions (Kelly, 2010). An advantage of these types of interviews is the ability to facilitate reciprocity between the participant and the interviewer, which means that the interviewer is able to adapt and improvise questions based on the participants' responses (Hardon et al., 2004; Rubin & Rubin, 2005; Polit & Beck, 2010). The aim of using semi-structured interviews is to gain a rich understanding of the phenomena through the collection of similar types of information from each participant (Holloway & Wheeler, 2010), by guiding participants on what to talk about (Gill et al., 2008).

The rough structure of the interview is formulated using an interview guide. According to Kallio et al. (2016) the development of a semi-structured interview guide involves five phases. The first phase is identifying the prerequisites for using semi-structured interviews. Here the researcher must determine whether semi-structured interviews are an appropriate method in which to answer the research questions. Therefore, some areas of the phenomena must be pre-determined based on previous knowledge (Turner, 2010). Furthermore, semi-structured interviews are suitable for studying people's perceptions and opinions (Barriball & While, 1994), especially when participants have a low level of awareness of the subject matter (Astedt-Kurki & Heikkinen, 1994), as it allows for diverse perceptions to be expressed.

The second phase is retrieving and using previous knowledge (Kallio et al., 2016). In this phase researchers aim to gain a comprehensive and adequate understanding of the subject which often comes from an extensive literature review focused on the purpose of the study (Barriball & While, 1994; Krauss et al., 2009). It is important for the researcher to have a good grasp on the phenomena as it helps to create a predetermined framework for the interview (Barriball & While, 1994; Turner,

2010). In this study a rough interview guide was developed based on findings from the literature review provided in the previous chapter.

Formulating the preliminary semi-structured interview guide is the third phase (Kallio et al., 2016). Here, an interview guide is formulated as a tool for interview data collection. An interview guide is defined as a list of questions which direct conversation towards the research topic during the interview (Astedt-Kurki & Heikkinen, 1994; Krauss et al., 2009; Cridland et al., 2015). The interview guide should be 'loose' and flexible and therefore allow for dialogue within the interview, the ability to change the order of the questions, and easy movement from question to question. This will occur when the questions in an interview are not leading, clearly worded, single-faceted, and open-ended (Astedt-Kurki & Heikkinen, 1994; Baumbusch, 2010; Cridland et al., 2015; Dearnley, 2005; Turner, 2010; Whiting, 2008). Consequently, the interview guide should generate answers from participants which are spontaneous and as in-depth as possible, as well as allow for new concepts and themes to emerge throughout discussion (Dearnley, 2005; Baumbusch, 2010; Krauss et al., 2009).

There are two levels of questions: main-themes and follow-up questions (Kallio et al., 2016). Main-themes cover the main content of the research subject and, within them, participants are encouraged to speak freely about their perceptions and experiences (Astedt-Kurki & Heikkinen, 1994). In comparison, follow-up questions, also known as probing, are used to make the main themes discernable for participants (Turner, 2010) as well as maintain the flow of the interview (Whiting, 2008). They can be pre-designed (Whiting, 2008; Rabionet, 2011) or spontaneous based on the participant's answer, for example asking the participant for more information or an example of the issue (Dearnley, 2005; Whiting, 2008). Asking follow-up questions can be verbal, such as the previous examples, or non-verbal, such as remaining silent and allowing the participant to think aloud (Whiting, 2008).

The fourth phase is pilot testing the interview guide (Kallio et al., 2016). This phase helps to confirm whether the preliminary guide covers all relevant themes and whether it deviates from the key topics at all. This testing helps to identify any necessary changes that need to be made to the

guide to help improve the quality of data collection (Barriball & While, 1994; Chenail, 2011). In this study, pilot testing was completed by means of field testing where the preliminary interview guide was tested on potential study participants. Therefore, the real interview situation was simulated to test whether the questions were comprehensible by the participants, relevant to the study, and to determine whether they truly elicited the participants' varied perceptions and experiences (Barriball & While, 1994; Chenail 2011). This testing method also helped to determine the amount of time would be required per participant and/or whether there were any other flaws or limitations in the design (Chenail 2011; Cridland et al., 2015).

The final stage is presenting the complete semi-structured interview guide. This should be a clear and logical guide for data collection (Kallio et al., 2016). The completed interview guide for this study can be found in the Appendix (See Appendix 7.3 – Interview Guide).

In the study, the participants were asked to participate in a semi-structured interview after it was clear that they were fully aware of the purpose of the study. These interviews were conducted directly after the observation and took approximately five to seven minutes per participant. The interviews were designed to have a formal, semi structured nature, to allow for new themes to emerge throughout discussion, and to help determine Research Objective Three (factors that lead to food wastage) (Duignan, 2016).

The interviews were conducted in the participants' homes. Conducting interviews in places familiar to the participant was used to help form a more relaxed and open discussion (Gill et al., 2008). It was desired for participants to lead as much of the discussion as possible, however, probing was used when clarification was required or to stimulate discussion and help to gain a deeper understanding (Hart, 1989). The questions related to: shopping behaviours, such as how often they shop, do they take a list to the supermarket; cooking behaviours, such as do they enjoy cooking, do they consider themselves a good cook; and overall waste behaviours and attitudes, such as what do they do with produce that is starting to go off, do they look at use by/best by dates. Therefore, these interviews were designed to help form a sense of the underlying factors which

influence how much food waste each individual creates and whether their living arrangement has a significant effect.

3.4.4.4.1 Data Analysis - Interviews

The interviews were audio taped and then transcribed verbatim. The interview data was analysed by way of thematic analysis. Thematic analysis is defined by Daly et al. (1997) as the identification, analysis and interpretation of patterns of meaning to form a description of a particular phenomenon. Fereday and Muir-Cochrane (2006) suggest that thematic analysis involves identifying themes throughout the process, reading the data carefully and then re-reading the data several times. The method utilised in this paper is inspired by Braun and Clarke's (2006) six-step approach: getting familiar with the data through transcription; generating initial codes; searching for themes; reviewing themes; defining and naming themes; and producing the final written output. Throughout the analysis, the researcher ensured that the extraction and interpretation of findings were based on the raw data rather than their own impressions. Furthermore, the researcher attempted to generate meaning from the data in identifying the emergence of key themes and patterns.

3.4.4.4.2 Limitations - Interviews

Qualitative interviews can be affected by some limitations, many of which come down to the role of the researcher. This is due to bias being created through issues such as: the researcher's mental and other discomfort could pose a threat to the truth value of data obtained and information obtained from data analyses; the preparedness of the researcher to conduct the field research; and the appropriateness of the interviews conducted to the study (Poggenpoel & Myburgh, 2003).

Furthermore, the degree of affinity a researcher has with the population they are studying, including membership in the population itself, can lead to the creation of bias. This is because in this particular situation, the researcher may limit their questioning in order to only discover what

they think they do not know as opposed to encompassing the issues they don't know they don't know (Chenail, 2011).

There are also some limitations that arise from the participant. Socially desirable responding is defined as the tendency to give overly positive self-descriptions, in other words, to choose the desirable response (Braun, Jackson & Wiley, 2001). As being seen to be environmentally friendly is becoming more socially desirable the likelihood of seeing more consciously reported behaviours is high. This is because participants may fear they will be scrutinised by the researchers if they provide answers that are not in line with social norms (DeLyser et al., 2010). Therefore, further bias can be created within the research.

3.5 ETHICS

In order to ensure the protection of the researcher and participants during the research process, the researcher obtained approval from the University of Canterbury Human Ethics Committee before the study commenced (See Appendices 7.4 & 7.5 – Ethics Application and Approval Letter). In addition, approval and guidance was also sought from the Associate Dean Māori in the College of Business and Law to reduce the likelihood of the study causing cultural offense.

It was identified that during the garbology stage there was the potential to inadvertently cause moral offense. Therefore, in order to mitigate this risk only the rubbish bins housed within participants' kitchens (i.e. not the red council bin which contains all household rubbish) was examined. This was in order to reduce the amount of 'personal waste' found as well as reducing potential embarrassment for the participant. Permission for going through the rubbish bins was also specifically asked for through a separate information and consent form explicitly for this part of the study (See Appendix 7.6 & 7.7 - Information Sheet for Examination of Rubbish Bin and Consent Form). If an informant was not willing to participate in this part they were able to withdraw from the study receiving no penalty.

Furthermore, in order to mitigate risks for the researcher during this process, protective heavy duty gardening gloves and a face mask were worn when examining rubbish as exemplified in a garbology study undertaken by Cote, McCullough & Reilly (1985) on the effects of unexpected situations on behaviour-intention differences. Moreover, the ‘working in a client’s home’ protocol from the University of Canterbury’s Social Work and Speech Therapy Department was followed. Therefore, the researcher was accompanied by a fellow postgraduate student on flat visits, with both students ensuring they had fully charged cellphones at all times in case of emergency. Furthermore, the researcher left a detailed description of the address being visited, the time the research would begin, the estimated time of completion and their cellphone number with one of their own flat mates who would be at home whilst they were completing the field work.

Moreover, all data gathered was kept confidential, stored securely and will be destroyed five years after the study is complete in accordance with the Human Ethics Committee principles. All audio recordings were deleted after transcription whilst the transcripts will be kept secure. Transcribed interviews were verbatim and participants were informed that they were able to review and/or withdraw their information at any stage before the 20th December, 2019. After this date the thesis was submitted for final review, and therefore, any changes were not possible. Participants were also assigned pseudonyms in the write up to ensure confidentiality.

3.6 CONCLUSION

This chapter provided a comprehensive description of the methodology used in the study with the aim of guiding the reader through each step of the complex research process. The chapter was comprised of six different sections including: the purpose of the research; the research philosophy including the epistemological and theoretical perspectives; the setting; the process used for identifying participants and sampling; the method including the research objectives, research design comprising of participant observation, qualitative interviews, fridge ethnography, and garbology, the data analysis techniques used and the limitations; and finally the ethical considerations and the preventative steps taken to mitigate any risks.

4. FINDINGS

4.1 INTRODUCTION

This chapter presents the empirical findings gathered from the performed data collection methods. The findings are presented in the same order as was introduced in the methodology. Therefore, after the context is discussed, this chapter is divided into four main sections: participant observation, fridge ethnography, garbology, and interviews. A series of tables are presented through each of the four sections to illustrate the data gathered. However, more specifically, participant observation includes a summary of the ingredients used by participants; the waste created; and the rubbish bins housed in flat kitchens. Secondly, fridge ethnography findings summarise the refrigeration and freezer space available in the flats, as well as the four main categories of foods found within the refrigerators: fruits and vegetables, dairy products, condiments and leftovers. The garbology findings include a description of the unavoidable, avoidable and possibly avoidable food waste found within the general rubbish and organics bins. And finally, the interview findings discuss the key themes which emerged during thematic analysis in terms of meal sharing, shopping behaviours, cooking behaviours and overall waste behaviours and attitudes. The chapter will conclude with a description of the key findings.

4.2 CONTEXT

A total of nineteen informants were observed and interviewed (See Table 4.1 - Flat Composition). In the study there were nine female respondents and ten male respondents all of which were between the ages of 20 and 25 and studied at one of the three tertiary education providers in Christchurch. Of the informants, seven females lived exclusively with other females, seven males lived exclusively with other males, whilst three of the males and two females lived in mixed gender flats. Therefore, the gender split was relatively even. The average number of flat members was six, however the flats studied ranged from three to ten flat mates. The living situation tended to be individuals living in separate rooms with shared living spaces.

Flat Composition			
	Gender	Flat Composition	# of Flat Members
1	Female	Mixed (4 females, 3 males)	7
2	Female	Female	7
3	Male	Male	4
4	Female	Female	7
5	Female	Female	6
6	Male	Male	6
7	Male	Male	6
8	Male	Mixed (1 females, 3 males)	4
9	Male	Mixed (2 females, 4 males)	6
10	Female	Female	5
11	Male	Male	10
12	Male	Mixed (2 females, 2 males)	4
13	Female	Mixed (3 females, 1 male)	4
14	Male	Male	8
15	Female	Female	4
16	Male	Male	6
17	Female	Female	3
18	Female	Female	5
19	Male	Male	5
Total	9x Females 10x Males	7x Female 7x Male 5x Mixed	107
			Average: 6 (5.6)

Table 4.1: Flat Composition

4.3 PARTICIPANT OBSERVATION FINDINGS

The focus of the participant observation stage was to determine what sorts of foods are being wasted by tertiary students living in student flats in Christchurch and whether the food is being properly disposed of (i.e. composted). More specifically, the stage was used to determine how much food waste was created throughout the meal preparation process; the types of foods that were being wasted; and how the participant managed the food waste they created.

Meal preparation ranged from 20 - 85 minutes, with an average time of 47 minutes. All of the informants, apart from one, were cooking for two or more people, with ten of the participants preparing a meal for their entire flat, and some preparing extra portions with the intention of having these for lunch or dinner in the next one to two days. The informal direct observation gave an initial insight into the food waste practices through examination of individuals food preparation practices. It also began to provide data to describe different aspects of food waste management within the flat situation including what goes on, who is involved, when and where things happen, and why these different things happen.

The participant observation findings were split into three sections: ingredients used by the participant during their meal preparation; the waste created by the participant during meal preparation; and lastly the different bins housed within the kitchen and the use of these bins by the participant during meal preparation.

4.3.1 Ingredients Used

To address Research Objective One, the first stage of participant observation was to determine the types of ingredients the participant was using. This was desired in order to identify the composition of fresh, preserved, and frozen items as a way to assess the perishability of the ingredients selected. The FDA (2019) has defined fresh foods as any food that is raw or unprocessed. However, in this study, fresh food is defined as any food that is not preserved by canning, dehydration, or freezing

(Vocabulary, 2019). Therefore, it includes any fresh fruits or vegetables as well as any products with a short shelf life such as non-frozen meats and dairy products including milk, and yoghurt.

In comparison, preserved foods are defined as any foods which have been physically or chemically treated in order to prevent their wastage or spoilage and to retain their nutritional value for a longer period of time (Shiksha, 2012). This includes many condiments and dried carbohydrates as well as longer lasting dairy products such as butter and cheese. Frozen was therefore any products, such as meat or vegetables, which had been stored in the freezer.

On the whole, all participants used a combination of fresh and preserved, with a relatively even split between both fresh and preserved ingredients, and only four incorporating frozen items (See Appendix 7.8 - Participant Observation Findings). Fresh ingredients also tended to be used up in the dish, rather than having leftovers to store away for future use, except for items such as broccoli, mushrooms, and cucumber which come in sizes larger than what is needed for typical portion sizes. In comparison, preserved or frozen items were typically used and then stored away for later use due to also coming in larger portion sizes.

4.3.2 Waste Created

Food items, or parts of food items not used in meal preparation ended up in one of three places. Back into the pantry, refrigerator, or freezer to be used later; into some form of an organics bin to be disposed of in the CCC green lidded bin; or into the kitchen rubbish bin with the rest of the household waste created in the flat.

All participants, apart from one, created some form of food waste during their meal preparation (See Table 4.2: Food Waste Created (All Participants)). A considerable amount of the waste that was created can be classified as unavoidable, and consisted of what are considered inedible skins (i.e. garlic, ginger, onion, and avocado skins), stalks (i.e. capsicum stalks, or carrot and bean ends), cores (i.e. red cabbage core, capsicum seeds and avocado stones), and rinds (i.e. lemon and lime rinds). In comparison, very little avoidable food waste was created, with just two participants

throwing away packets of dressing which came with pre-cut vegetables they had both used in their meals. However, there was some food waste created which could be classified as possibly avoidable. This consisted mostly of skins from meat (i.e. chicken and bacon) and vegetables (i.e. potato, kumara and pumpkin skins); stalks (i.e. broccoli and cauliflower stalks); and cores (i.e. cucumber seeds). Although these parts of the meat and vegetables may not have been desired by the informant at the particular time, they are foods which can be easily prepared and consumed (Parfitt et al., 2010).

Food Waste Created (All Participants)		
Unavoidable	Avoidable	Possibly Avoidable
<i>Skins</i> - Garlic skin x2 - Ginger skin - Onion skin x12 - Avocado skin x2	<i>Sauces</i> - Broccoli dressing - Pre-packaged coleslaw dressing	<i>Skins</i> - Chicken skin x2 - Bacon fat - Potato skin - Kumara skin - Pumpkin skin
<i>Stalks</i> - Capsicum stalk x4 - Eggplant top - Bok choy ends - Carrot ends x5 - Courgette ends - Asparagus ends - Cucumber ends x2 - Bean ends x2		<i>Stalks</i> - Broccoli stalks x8 - Cauliflower stalk and leaves x2
<i>Cores</i> - Red cabbage core - Capsicum seeds x5 - Avocado stone x2		<i>Cores</i> - Cucumber seeds
<i>Rinds</i> - Lemon rind - Lime rind x2		

Table 4.2: Food Waste Created (All Participants)

Items Stored for Later Use (All Participants)	
Perishable	Non-perishable
<i>Vegetables</i> - Half onion - Broccoli x3 - Mushrooms x2 - Bean sprouts - Bok choy - Cucumber - Fresh herbs - Courgette	<i>Vegetables</i> - Frozen vegetable mix x2 - Pre-crushed garlic x2 - Pre-crushed ginger
<i>Dairy Products</i> - Milk x2 - Cheese - Butter x2	<i>Flavouring</i> - Curry paste x4 - Sesame oil - Soy sauce x2 - Honey - Fish sauce - Pasta sauce - Sweet chilli sauce x2 - Packet spices x4 - Mayonnaise - Chipotle sauce
<i>Meat</i> - Uncooked chicken	<i>Carbohydrates</i> - Rice noodles - Dried pasta - Rice x4 - Buckwheat - Breadcrumbs - Flour - Sugar - Brown rice and quinoa mix

Table 4.3: Items Stored for Later Use (All Participants)

As well as creating food waste, all participants also put some items back into the pantry, refrigerator, or freezer to store for later use. These items have been classified as either perishable or non-perishable (See Table 4.3: Items Stored for Later Use (All Participants)). Perishable foods are defined as any foods which have a short shelf life and in order to store these foods for any length of time, they must be stored in the freezer or refrigerator where they will need to be used within several days (UNL Food, 2020). This includes items such as vegetables, dairy products,

and meat. Non-perishable foods are any goods which will lose quality over time, however, will not spoil unless they are handled carelessly (UNL Food, 2020). This includes items such different flavourings for meals as well as a range of carbohydrates.

4.3.3 Rubbish Bins in Kitchen

Based on the Christchurch City Council kerbside collection, a perfect in-house waste system would include three separate bins: one for general household rubbish, one for recycling, and one for organic waste (food and garden waste) (Christchurch City Council, 2019c). However, this was not the case for most of the flats in the study (See Table 4.4: Bins Housed in Kitchen).

Bins Housed in Kitchen			
	Rubbish	Recycling	Organics
1	✓		✓
2	✓	✓	✓
3	✓	✓	
4	✓	✓	✓
5	✓	✓	✓
6	✓	✓	✓
7	✓		
8	✓	✓	
9	✓	✓	✓
10	✓	✓	✓
11	✓		
12	✓	✓	
13	✓	✓	✓
14	✓	✓	
15	✓		
16	✓	✓	✓
17	✓	✓	
18	✓	✓	✓
19	✓	✓	

Table 4.4: Bins Housed in Kitchen

Unsurprisingly, all flats had some form of 'bin' within the kitchen to dispose of general kitchen and household waste. These bins included a small plastic supermarket bag hung on the pantry door handle, black plastic rubbish bags sitting on the kitchen floor, and the more common large bin with a plastic bag inside. A majority of these kitchen bins were quite full, and it appeared that the system in most flats was to fill the bin until it was no longer possible to fit anything else in, and then take it outside. When this bag was removed from the kitchen it was placed in the red lidded bin, or in some cases, next to the bin if it was already full.

Recycling bins were not as common, however, fourteen out of the nineteen flats did have some form of recycling system. In some flats this was a designated recycling bin, however in most cases it was instead a large cardboard box which was filled with recycling throughout the week, or until it was full. These bins were then taken outside and emptied to the yellow lidded bins.

Specific organic bins were the least common, with only ten of the nineteen flats having one. These bins were usually a small plastic bin or bucket approximately 2.5 - 12 litres in size. Four of the ten flats had bins which were covered by some sort of lid, whilst the remaining six were uncovered. As was with the general rubbish bins, the designated organics bins were all reasonably full and appeared to be emptied quite infrequently. However, there was one flat who used a large metal bowl which they filled with food scraps throughout the meal preparation process. Once they were finished cooking, they then emptied the contents of the bowl into the green lidded bin and rinsed out the bowl, a process they did each night after dinner ready to be used again the next day. From observation, this appeared to be the most successful organics disposal method used within the flats.

After the participant observation stage was complete and the true purpose of the study was disclosed, no participants chose to withdraw from the study and all continued on to the next stage.

4.4 FRIDGE ETHNOGRAPHY FINDINGS

As was with participant observation, fridge ethnography was used to determine what sorts of foods are being wasted by tertiary students living in student flats in Christchurch and whether the food is being properly disposed of (i.e. composted). Furthermore, participant observation was incorporated into the research design as a way to help explain the connection between what is purchased and what is discarded by tertiary students. Through assessing the refrigeration and freezer space available within the flat and then initiating an unstructured rummage through the contents of the refrigerator, an inventory of sorts was able to form. This inventory helped to create linearity between what the participants said and reality through facilitating storytelling about the food and the reasons for why it is wasted. The main categories that were assessed were fruits and vegetables, dairy products, condiments, and leftovers, each of which are discussed in turn below.

4.4.1 Refrigeration and Freezer Space Available

All of the flats had refrigeration and freezer space available (See Appendix 7.9 - Fridge Ethnography Findings). On average, flats had one fridge for every four (4.4) flat members. These were typically quite full especially in larger flats where there was only one fridge shared between all flat members. Food items that had gone off tended to have been pushed to the back of the fridge and it is likely that these items had been forgotten about when blocked from view by fresher items. This can be seen in Images 4.1 and 4.2 where it is difficult to gain a visual of all items in the refrigerator especially in Image 4.2 which is a refrigerator that is shared between eight flat mates. In terms of freezer space, on average the flats also had one freezer for every four (4.02) flat members, however six of the flats had a chest freezer which allowed for considerably more space. Although, this extra space did not necessarily reduce the amount of food in their fridge and consequently did not reduce the amount of food that was going off.



Image 4.1: Fridge Contents Observed
Flat #12



Image 4.2: Fridge Contents Observed
Flat #14

4.4.2 Fruits and Vegetables

Fresh food is the largest category of food waste in terms of volume (NSW EPA, 2012). Therefore, fruits and vegetables are commonly thrown away as they spoil quickly, often before individuals have had a chance to eat them. Of the flats observed (See Appendix X- Fridge Ethnography), only six had fruits and vegetables which all appeared to be relatively fresh, however, one flat had no fruits or vegetables in the fridge at all. Fruits and vegetables which were hidden from view, such as at the back of the fridge or in a fridge draw, were more likely to have started going off or gone mouldy. This was also more likely when a fridge was very full. Furthermore, vegetables were also usually stored uncovered in the fridge, which meant that half used items, such as half an onion, or half a lemon were likely to go off quicker.

Carrots were found to be one of the most common vegetables to be left for extended periods of time in the refrigerator. This is likely because they are often purchased in ‘bulk’ plastic bags with pre-determined weights. Thus, increasing the amount purchased, which could be more than an individual, or flat, needs, and also makes it harder to tell when they are starting to lose freshness due to being partially covered by a plastic bag. This is very similar to lettuce and pre-packaged salads, which were also commonly found to be going off, as they also regularly come in plastic packaging, often in sizes bigger than what is desired for one or two meals.

4.4.3 Dairy Products

Dairy products were typically within the expiry date with eleven of the nineteen flats having all dairy products within the date and four having no dairy products at all. However, when dairy products had expired, they were more likely to have been sitting in the fridge for a long time, with three flats having milk which had expired by one to five months, three flats having yogurt which was expired by one week to five months, and one flat which had cream which was expired by one and a half months. The flats with expired dairy products were more likely to be all male flats, with male flats also tending to have more dairy products in general.

4.4.4 Condiments

In comparison to dairy products, condiments, such as salad dressings and sauces, were more likely to have passed their best-before dates with only five flats having all condiments in the refrigerator within their expiry dates. The remainder of the flats had a majority of their condiments within their expiry dates, however, they had one or two which were outside their best-before date by up to six months. However, one flat had some salad dressing which had expired by two years.

4.4.5 Leftovers

Leftovers are one of the largest categories of food waste by volume, second only to fresh foods (NSW EPA, 2012). Of the flats studied, seven had no leftovers in the refrigerator, however the

remaining twelve had leftovers of some kind (See Appendix 7.9 - Fridge Ethnography). Three of the flats had some leftovers which were one to two days old and were expected to be eaten in the next day or two. Six had some leftovers which were thought to be up to a week old and informants were unsure of who they belonged to or when they were going to be eaten. One had some leftover rice and coleslaw which was thought to be a week old and when it was pointed out to the informant, they put it in the bin. Finally, one flat described the leftovers in their fridge as having “been there for weeks” and knew whose they were but no one was going to throw them out any time soon.

4.4.6 Other

Excluding the items discussed above, the remainder of the items in each of the individual flat’s refrigerators were within the best-before/use-by dates apart from in two flats. One of these was a flat of six males who had some shaved ham which had expired by five days, and a cake which had been in the fridge for two weeks. Similarly, the other was a flat of ten males where lots of the items in the fridge were looking a bit worse for wear. Some other items in their fridge included raw venison, which was a few days old, a loaf of bread which was a few weeks old, some ham which had expired by one month, and some pastrami which had expired by two months.

4.5 GARBOLOGY FINDINGS

Garbology was utilised in this study to help determine Research Objective Two: whether food is being properly disposed of (composted) by tertiary students living in student flats in Christchurch. Therefore, the garbology stage used patterns in fresh rubbish in order to identify how informants create and dispose of waste. All participants were happy to participate in this stage of the research, with no one refusing examination of their kitchen waste (See Appendix 7.6 - Information Sheet for Examination of Rubbish Bin). This process helped to determine where the majority of food waste ends up (i.e. how much compostable food waste ends up in the red lidded bin in comparison to the amount that ends up in the green lidded bin).

Of the flats studied, nine had no designated organics bin in the kitchen. However, just because a flat had an organics bin in the kitchen did not necessarily mean it was always used. All of the flats which did have an organics bin had some form of food waste in their regular kitchen rubbish bin as well (See Appendix 7.10 – Garbology Findings). Most of these had a significant deal of contamination, with just one flat only having the end of a carrot in their general waste. In some cases, the volume of food waste was significantly higher than the volume of non-food waste.

As the organic's bins were typically quite small they were likely to fill up quickly. Furthermore, due to the nature of food waste, these bins were likely to get off-putting very quickly, both through producing a foul smell and becoming unappealing to look at. Despite this, it appeared that for many of the informants it was much easier to put any food waste that could not fit into the general waste, rather than taking a few moments to empty the organics bin into the green-lidded Council bin. This can be seen in both Images 4.1 and 4.2 as the contents of the general rubbish bins are highly contaminated with food waste. It is also believed that at both of these flats there was more food waste than general waste in the bin.

Unavoidable food waste in the general rubbish bins housed in flat kitchens was predominantly made up of fruit and vegetable skins, stalks, cores and rinds (See Table 4.5: Unavoidable Food Waste in General Rubbish). The most common fruit and vegetable items found were banana, onion, and avocado skins; carrot ends; apple cores; and lemon rinds. Other common items were coffee grinds, tea bags, eggshells, and chicken bones.



Image 4.3: General Waste Content from
Observed Flat #11



Image 4.4: General Waste Content from
Observed Flat #14

Unavoidable Food Waste in General Rubbish				
Fruits/Vegetables	Dairy	Condiments	Leftovers	Other
<i>Skins</i> - Banana skins x8 - Orange peel - Onion skin x7 - Garlic skin - Ginger skin - Tamarillo skin - Avocado skins x6 - Manadrin peel				- Coffee grinds x2 - Tea bags x5 - Egg shells x10 - Chicken bones x4 - Ham bone
<i>Stalks</i> - Carrot ends x5 - Grape stalk - Celery leaves - Bok choy stalk - Cucumber end				
<i>Cores</i> - Apple core x5 - Capsicum seeds				
<i>Rinds</i> - Lemon rinds x4				

Table 4.5: Unavoidable Food Waste in General Rubbish

Similarly, unavoidable food waste found in the kitchen organics bins was primarily made up of fruit and vegetable waste (See Table 4.6: Unavoidable Food Waste in Organics bins). This waste consisted of avocado and pomegranate skins; carrot, bean and courgette ends; cucumber seeds; and lime rinds. Egg shells and chicken bones were also common; however, a majority of the unavoidable waste was unidentifiable scraps.

Unavoidable Food Waste in Organics Bin				
Fruits/Vegetables	Dairy	Condiments	Leftovers	Other
<i>Skins</i> - Avocado skin and stone x3 - Pomegranate skin - Banana skins - Onion skin				- Egg shells x2 - Chicken bones
<i>Stalks</i> - Carrot ends - Bean ends - Courgette ends - Capsicum stalk - Bok choy ends				
<i>Cores</i> - Cucumber seeds				
<i>Rinds</i> - Lime rind x2				

Table 4.6: Unavoidable Food Waste in Organics Bin

4.5.2 Avoidable

Avoidable food waste was arguably the largest portion of food waste found in the flats general rubbish bins (See Table 4.7: Avoidable Food Waste in General Rubbish). Most of the food found was used or partially used and included a range of items from the fruits/vegetables, dairy, leftovers and ‘other’ category. In terms of fruits and vegetables, many of the partially used and unused items had gone mouldy, however many of the items appeared to be edible with either very few bruises or none at all. For example, one flat had discarded a whole pumpkin which had not been cut into. Another had a whole head of broccoli, which appeared to still be fresh, and items such as carrots and capsicum which may have had one spot on them. In regard to dairy products, these were all partially used and included different types of cheese. Although some had gone past their best-by date, none of the items found appeared to have grown any mould. Condiments were less common,

with only two half used containers of hummus being found. Of the leftovers discarded, a majority were meals that had either been purchased, or cooked in the flat, and were then half eaten. However, in one flat, there was an untouched pre-made sandwich and another had discarded an entire untouched family sized pie. There were also a variety of ‘other’ avoidable food waste items found in the general rubbish including lots of bread; cooked and uncooked meats; and whole eggs including one flat who had thrown away an entire carton of eggs.

Avoidable Food Waste in General Rubbish					
	Fruits/Vegetables	Dairy	Condiments	Leftovers	Other
Used/ partially used	<ul style="list-style-type: none"> - Canned peaches - Lettuce x2 - Half a bag of pre-packaged lettuce - Half cucumber x4 - Half bag of spinach - Half avocado - Spring onions - Half an onion x2 - Half a lettuce - Pre-crushed garlic 	<ul style="list-style-type: none"> - Blue cheese - Half pottle of cream cheese - Half block of feta - Wedge of cheese x2 - Bag of grated cheese 	<ul style="list-style-type: none"> - Half container of hummus x2 	<ul style="list-style-type: none"> - Half a carrot cake - Leftover lentil curry - Cooked chicken - Takeaway salad x2 - Takeaway wrap - Sushi - Cooked rice x5 - Brownie - Green curry - Half a burger - Fried rice - Cooked pasta x2 - Cooked mince x2 	<ul style="list-style-type: none"> - Chicken crumb - Vanilla custard - Half tin of baked beans - Pizza crusts - Half loaf of bread x4 - Frozen potato wedges x2 - Tegal chicken - Half packet of crackers - Container of mussels - Bag of dry couscous - Corn chips - Ham - Dried spaghetti
Unused	<ul style="list-style-type: none"> - Whole mandarin - Whole capsicum - Whole banana - Whole carrots - Whole apples - Whole onion x2 - Tomato x3 - Whole pumpkin - Whole broccoli x2 - Whole lemon x2 			<ul style="list-style-type: none"> - Whole sandwich - Whole pie 	<ul style="list-style-type: none"> - Muesli bar x2 - Chicken breast - Uncooked steak - Tortilla wrap x2 - Cheese sandwich - Eggs x2

Table 4.7: Avoidable Food Waste in General Rubbish

Of the ten flats with an organics bin, only two were found to have no avoidable food waste in their organics bin. Fruits and vegetables and leftovers were the categories of avoidable food waste

found. There was a mix of partially used and unused items found with many of the fruits and vegetables being thrown away due to having gone mouldy. In terms of leftovers, cooked carbohydrates such as rice and pasta were common. This is not surprising however as it can be hard to estimate a desired portion of these types of foods before cooking.

4.5.3 Possibly Avoidable

Possibly avoidable food waste was less common than unavoidable and avoidable. This category is also difficult to judge due to the criteria for determining what is 'possibly avoidable' is ambiguous and changes from person to person. However, the possibly avoidable food waste found in the general rubbish and organics bins consisted mostly of skins and peels from kiwi fruit, pumpkin, kumara, potato, carrot, salmon and chicken; as well as broccoli stalks and bread crusts.

4.6 INTERVIEW FINDINGS

Interviews were incorporated into the research design to address Research Objective Three, determining the factors that lead to food wastage among tertiary students living in student flats in Christchurch. The interview guide was sorted into three sections: shopping behaviours, cooking behaviours, and overall waste behaviours and attitudes. These questions were used to help form a sense of the underlying factors which influence how much food waste each individual creates and whether their living arrangements have an effect on waste behaviours and practice.

All nineteen informants participated in a one-on-one interview with the researcher which ranged from five to seven minutes in length. These interviews were then transcribed and analysed through the six step approach to thematic analysis as per Braun and Clarke (2006). Firstly, transcription allowed the researcher to become more familiar with the data, which was followed by the generation of initial codes which can be seen in Appendix 7.11 - Interview Analysis Snapshot. After the interview analysis was complete, themes were searched for within the sections of meal sharing, shopping behaviours, cooking behaviours and overall waste behaviours and attitudes.

These themes were then reviewed, defined and named. Each of these themes are discussed in turn below.

4.6.1 Meal Sharing

4.6.1.1 *Personal Responsibility*

Within all flats, all flat members were responsible for some portion of the grocery shopping. This may have been in the form of them having to buy the items for the whole flat; buying the ingredients for the meal they were making for the flat; or purchasing all their own food. Furthermore, all flat members were responsible for cooking at some stage of the week whether that was once or twice for themselves and their flat mates throughout the week or cooking for themselves throughout the week.

4.6.1.2 *Group Responsibility*

Cooking as a flat was common with 12 out of the 19 flats observed having a majority of the flat members sharing meals most weeknights. However, this was typically unorganised with only two of the 12 flats who cooked together having a set rotation to organise who would cook on each night. Instead, informants stated: “we’re really bad we always just decide on the day, it’s like who’s going to cook tonight?”; “we kind of just fluctuate depending on the day”; “it’s pick on the day”. Furthermore, it was also common for flat mates to cook with others around to help, with eight of the informants stating that they always or sometimes cook together “cause it’s funny”, or “cause we’re like good mates” and cooking with others made the process not only easier, but also more enjoyable.

4.6.2 Shopping Behaviours

4.6.2.1 *Organisation*

Organisation and structure to shopping behaviours appeared to be lacking for a majority of the tertiary students. Thirteen of the informants claimed to only visit the supermarket one to two times

a week, as opposed to four who stated that they went five or more times a week with one informant stating they go to the supermarket “every day, sometimes more than once a day”. Although individual supermarket visits were relatively low, total flat trips to the supermarket were quite high, with seven of the informants, out of the 12 who cooked as a flat, stating that they purchased the ingredients for the meal they were making on the day, rather than doing one big flat shop. Furthermore, of the 19 informants, 13 stated that they made no real effort to plan out their meals in advance. Instead, they were more likely to pick what they were going to cook on the day or even whilst they were at the supermarket. As a likely result of this lack of planning, ten informants stated that they never took a list to the supermarket, with only two informants claiming to use an extensive list each time they visited the supermarket.

4.6.3 Cooking Behaviours

4.6.3.1 *Minimal Effort*

When it came to the meal preparation process, many of the informants expressed how for them cooking was quite a lot of effort and took up a lot of their time. Of the informants, five stated that ‘time wasted’ was their least favourite part of the process. One informant was quoted as saying “I only do it (cooking) so I have something to eat, I don’t do it cause I enjoy it” and another saying “like there’s just those certain times where you really don’t feel like cooking”. Therefore, many flat members cooked together, or in bulk, to reduce the amount of cooking they had to do each week with eight informants claiming to only cook one to two times a week, four cooking three to four times and seven cooking five or more times a week. Moreover, the final aspects of the meal preparation process, cleaning up and doing the dishes, was a majority of the informant’s least favourite part of cooking with 12 informants stating this was their least favourite part of the process. Furthermore, informants were more inclined to stick to the same or similar meals when cooking, rather than branching out and trying new recipes. For example, one informant regularly cooked a pork roast because “It’s easy to cook, it’s delicious and it’s cheap” and another regularly made venison burgers because “that’s like the easiest thing to make”. As a result, when stating the types of meals they did not like to cook, seven informants stated they did not like cooking meals

which had too many elements and therefore became too difficult or took up too much time with one respondent saying “I usually cook pretty like, well not basic, but like low admin meals, so yea, anything that’s like you’ve gotta be working for an hour over it” and many stating “I would never do a lasagna” due to the time and effort required.

4.6.3.2 *Social Experience*

Although cooking was often a burden to many of the informants, it also acted as a social experience for many as it was an opportunity for them to connect with their flat mates. As stated above under ‘group responsibility’, informants stated that they sometimes cooked together “cause it’s funny”, or “cause we’re like good mates”. However, respondents also stated that one of their favourite aspects of the meal preparation process was the rewarding feeling you got after making a good meal for yourself and your friends such as one respondent who said “just the smile on their (flat mates) face after having a good meal”. Others appreciated how cooking was able to bring their flat mates together after a long day with one saying “the thing I like about cooking for my flat mates is that I like getting everyone together and sitting down and chatting, it’s really nice” and another stating “I personally like, like people having dinner at the table, I reckon that’s cool”.

4.6.3.3 *Contrary Beliefs*

A majority of the informants stated that they often had leftovers after cooking a meal, with 14 claiming to regularly or always have leftovers. Of these 14, nine claimed that they were ‘good’ at eating these leftovers and that they very rarely went to waste stating things such as “I’m usually pretty good at eating them yep, as I said I usually take them for lunch the next day” and “yes. Very good at eating them (leftovers)”. Furthermore, male informants were more likely to claim that they were ‘good’ at eating their leftovers with five of the informants from all male flats stating that they were ‘good’ at eating their leftovers despite all but one of the all male flats having some form of leftovers in their rubbish or organics bin.

4.6.3.4 *No Desire to Consume Leftover Food*

Moreover, many respondents, especially those who cooked alone, also stated that they often cooked a large meal with the intentional goal for the meal to last several mealtimes. However, they regularly failed to consume the entirety of the meal before it went off due to losing the desire to eat it. Some informants were quoted as saying “I have had a couple of instances with soup and you just make so much and then you get bored of it, that’s why I don’t really tend to bulk cook anymore, cause I just get sick of it and don’t end up eating it” and “like last week I had like enough for lunch and then probably like a half meal and like by the time I had it for dinner and then lunch... I was just like oh I don’t feel like that so I just threw that out”.

4.6.4 Overall Waste Behaviours and Attitudes

4.6.4.1 *Desire for Quality*

Despite being students, many of the informants appeared to have a desire for quality. Many admitted to being quick to throw away produce as soon as it showed signs of losing freshness with one stating “I’m pretty quick to put it in the bin. I don’t really try and salvage it. Sometimes I’ll try and use it if I think it’s about to go off, but if it looks like it’s going off then it’s gone” and another saying “they’d (produce that is starting to go off) probably go in the bin” and when asked if they would try and selvedge any of the item they said “f*ck no. Binned”. Furthermore, many participants stated that they were more likely to check best-before dates because of the taste of an item rather than the risk of getting sick. This meant that they were more likely to do a smell and/or taste test and subsequently check the date. One respondent stated, “I’d normally go off smell, and look and taste more than that, but I’d use it as an indicator” and another saying they would use the dates “more for spoilage, like I’m just really worried about the taste”. However, meat, particularly chicken, and milk were often an exception as many were worried they would get sick if they consumed these products after the expiry date.

4.6.4.2 *Laziness*

In terms of food waste management although ten of the 19 flats had some form of organics bin in their kitchen, many admitted that the bin was not always used, and food waste often ended up in the general rubbish. One informant stated “well if the compost bin is full I’ll probably just put it (food waste) in the rubbish to be honest” and another saying “we sometimes get a bit lazy (with using the organics bin)” and a third stating that food was often put into the general bin “because people can’t be bothered sorting”. Furthermore, some participants said they had tried to implement an organics bin into the kitchen system however their flat mates had not accepted it with one saying “I tried at the start to do it (use a compost bin) but it’s more just the fact that no one can be f*cked doing it”.

4.6.4.3 *Organisation*

Organisational skills, or lack thereof, also came into play in terms of rubbish disposal within the flat. A majority of the informants stated that their flat had no set rotation for taking the rubbish out, with 13 informants stating that someone would just “use their initiative” and do it when it was time with one saying “like if you can’t stack out without something falling out then you’ve got to take it outside” and another saying “I don’t think there is actually a specific way of deciding who does it. We kind of just get it done”. In comparison, only two of the informants claimed to have a set rotation for taking out the rubbish bins and the remaining three said that the same person usually did it.

4.6.4.4 *Parental Influence*

Only three claimed to have the same or similar rubbish practices as their parents therefore many students do not necessarily implement the waste practices of their parents when moving into a flat. This is also difficult to judge as many students have moved to Christchurch from other areas of New Zealand where they do not have a kerbside organics collection or may live on a farm so have the opportunity to feed food waste to the animals or make into fertiliser.

4.7 KEY FINDINGS

4.7.1 Which Foods are Being Wasted?

The main categories of food commonly wasted by tertiary students living in student flats in Christchurch were leftovers and fresh foods. Furthermore, a considerable amount of the food waste created during participant observation was unavoidable, including skins, stalks, cores, and rinds. However, the findings from the garbology stage showed that students tended to throw away considerable amounts of avoidable food waste as this type of waste was the largest portion of food waste found in the general rubbish bins. This appeared to occur from both a lack of planning and also from foods getting pushed to the back of the refrigerator.

4.7.2 How is Food Waste Being Disposed Of?

Only ten out of the 19 flats had some form of bin specifically for organics which meant that many students were not taking the time to correctly sort their waste. Moreover, even if a particular flat had an organics bin in their kitchen, it did not mean it was used. This was found in the grabology stage where all of the flats observed had some food waste contamination in their general rubbish bin, with some flats general waste being made up predominantly of food waste. This appeared to be a result of the students taking a lack of responsibility when it came to sorting the rubbish and also from the rubbish bins being emptied very irregularly.

4.7.3 What Are the Factors that Lead to Food Wastage?

The most influential factor on food wasting practices was a lack of organisation skills held by tertiary students living in student flats in Christchurch. In terms of meal sharing and shopping practices, all informants and their flat mates were responsible for purchasing some portion of the food. This meant there were often ineffective purchasing practices in place leading to food waste from the crossover of purchases. There was also often no real effort put into planning meals in advance which created ineffective purchasing practices. In terms of cooking behaviours, there was again, minimal effort and organisation involved with a majority of respondents finding cooking a

burden, especially when it came to tidying up afterwards. Furthermore, many informants said they regularly made leftovers and claimed to eat these, especially males, however this often did not correlate with the garbology findings with leftovers being one of the largest categories found in the waste. Moreover, many respondents expressed having no desire to consume leftovers once they have made them, often getting sick of them or leaving them for too long which meant they had to be thrown away. In terms of overall waste behaviours and attitudes, the desire for quality held by many of the informants meant that they were quick to throw away produce as soon as it started to lose freshness but were also less likely to take notice of use-by dates. Organisation of waste practices was also influenced heavily by laziness which came into effect when sorting waste.

4.8 CONCLUSION

This chapter outlined the key findings from each of the four stages of the research design: participant observation, fridge ethnography, garbology, and qualitative interviews. Participant observation findings were comprised of ingredients used by participants, waste created, as well as a summary of the rubbish bins housed in kitchens. The fridge ethnography findings included the refrigeration and freezer space available, and the fruits and vegetables, dairy products, condiments and leftovers found within student's refrigerators. Garbology findings discussed the unavoidable, avoidable and possibly avoidable food waste found within the student's general rubbish and organics bins. Interviews, which were the final set of findings, included the key themes which emerged during questions on meal sharing, shopping behaviours, cooking behaviours and overall waste behaviours and attitudes.

5. DISCUSSION AND CONCLUSIONS

5.1 INTRODUCTION

This chapter presents a discussion of the major findings of the research. Firstly, the study insights are presented with reference to context, established behaviours and the discarding of food waste. These findings help to form two generalised personas of students in terms of food wasting practices and behaviours: planners and impromptu consumers, which are both discussed. Next, the theoretical, marketing, policy and methodological implications of the study are then outlined. This also includes recommendations for policy makers and marketers in order to reduce the food waste created by students living in student flats in Christchurch. Finally, the limitations of the study, including the methodological limitations and the limitations of the researcher, are discussed which is followed by potential future research directions which can help to build on this study.

5.2 STUDY INSIGHTS

As one third of the food produced throughout the world goes to waste each year (Grandhi & Singh, 2015), a series of complex environmental, economic and social consequences arise with it. Not only does the food waste produced throughout the world each year equate to one trillion US dollars (Cederberg & Sonesson, 2011), it also sees an inefficient use of the world's natural resources, and equally poses an ethical issue as despite the abundance of food production throughout the world not everyone has equal access to it (Aschemann-Witzel, 2018a). A majority of food waste is produced in developed countries with over 60% of it said to be avoidable (Lazell, 2016). Therefore, a shift in food wasting attitudes and behaviours is necessary in order to reduce the amount of food waste produced and to mitigate these, and the many other, consequences. If contamination levels continue in households, and more specifically student flats, by individuals discarding significant portions of their food waste with the general waste, goals, such as those of the Love Food Hate Waste campaign, to keep food waste out of landfills and converting organic waste into compost, cannot be effectively realised.

This study set out to explore the wicked problem of food waste, in the context of tertiary students living in student flats in Christchurch, and their attitudes and behaviours surrounding the issue. Despite being one of the largest identified food wasting groups, tertiary aged students are often overlooked when it comes to food waste prevention. This research project, which involved 19 informants living in student flats in Christchurch, was designed to explore three research objectives: the sorts of foods that are being wasted among tertiary students living in independent living situations (student flats) in Christchurch; whether food is being properly disposed of (composted) by tertiary students living in student flats in Christchurch; and the factors that lead to food wastage among tertiary students living in student flats in Christchurch. There were several key insights which emerged in light of these research objectives including context, established behaviours and the discarding of food waste, each of which are discussed, in turn, below.

5.2.1 Context

The overall findings from the research are consistent with those of Di Talia, Simeone and Scarpato (2019). They found that consumer behaviour is predominantly influenced by an individual's characteristics, and therefore where a person lives, including their living arrangements, helps to shape their personal attitudes and behaviours towards food waste. Therefore, in alignment with Research Objective Three (determining the factors that lead to food wastage among tertiary students living in student flats in Christchurch), simply living in a student flat appears to have a significant impact on food waste related practices. This was exemplified in the interview findings where there appeared to be a lack of parental influence on food waste practices. This meant that living in this new environment, away from the food practices they were brought up with, helped to influence and shape new attitudes and behaviours towards food waste which gives insight into why students living in student flats are one of the largest food wasting groups.

Furthermore, due to the generally large number of flat mates living in the student flats, it appeared that many students lacked personal responsibility when it came to food waste and general rubbish practices. This was due to the perception that other people in the flat would engage in food waste minimisation practices rather than themselves. For example, when it came to engaging in fridge

inventories and/or clear outs; the separating of general waste, recycling and organics; or taking responsibility for taking out each of the different rubbish bins. Many of the flats were noted as having extremely full rubbish bins, across all three types (rubbish, recycling, organic), to the point where anything new that was placed in the bin would simply fall onto the floor. Consequently, during the interview stage many informants stated that one person usually took the rubbish bins out to either one or all three of the council bins and therefore it was not their responsibility. Similarly, through observation it was found that students lacked the desire to take the time to sort their waste into the different bins. Therefore, the findings show that one of the biggest issues is students not separating their organics adequately.

Moreover, the fridge ethnography stage highlighted the lack of space available to many students when living in larger flats. With each person responsible for purchasing some or all of their own food, space was often very limited in the refrigerator which is less likely to occur in other living situations such as a family home. In many situations it is believed this would encourage people to engage in regular refrigerator clear outs of out of dates foods. However, as discussed in the previous chapters, students have heightened laziness and spontaneity. Therefore, it is more likely that clearing out the refrigerator becomes such a big task, with so many people adding food to it, that they simply throw away it all expired or mouldy food when they finally address the issue, and neglect to separate this waste into each of the three council bins.

5.2.2 Established Behaviours

The findings also correlate to those of Stefan et al. (2013) who found that food waste behaviours are derived from a consumer's established behaviours and routines as opposed to their actual intentions to create food waste. Consequently, as it was found by Evans (2012), Stancu et al. (2016), and Stefan et al. (2013), one of the most significant drivers of food waste in the home is an individual's ability to balance the amount of food they purchase and the amount they consume. This is usually influenced by an individual's day-to-day activities and are consequently routine behaviours, or the lack thereof, especially when it comes to planning practices such as meal planning, inventory checking, and use or non-use of shopping lists. This was reflected in findings

from the interviews where it was found that many students had no real structure throughout the entire food provisioning process, especially when it came to meal planning, shopping, and cooking responsibilities. For example, in regard to meal sharing, of the twelve flats who shared the responsibility for cooking dinner, only two had a set plan for who was going to cook each night. A study by Chandon and Wansink (2006) can help to explain these findings as they found that consumers are notoriously poor planners. In many instances this can lead to the over-purchase and wastage of food, particularly when they misestimate inventory at home and consequently purchase food they already have on hand. Moreover, the psychological theory of “planning fallacy” (Kahneman & Tversky, 1977), also sheds light on the findings. This theory suggests that consumers have a tendency to underestimate how much time will be needed to complete a future task. For example, an individual may over-purchase foods whilst at the supermarket based on the underestimation of time required to consume all the food they have in their basket or trolley, therefore foods get unused and go to waste.

Stefan et al. (2013) also found that planning and shopping routines have the largest influence on food waste creation. In alignment, many of the flats who cooked together frequented the supermarket every day in order to purchase food to cook that night, and only two informants out of all those surveyed claimed to take an extensive list to the supermarket each time they visited. These findings also corresponded to those of the NSW EPA (2012) that found that many individuals neglect to use shopping lists with younger respondents, those aged 18-24, the least likely. Moreover, the established behaviours of students also meant they were unlikely to carry out food inventories and/or clear outs of the refrigerator. This was seen through food regularly being pushed to the back of the fridge and forgotten about, especially dairy products which sat around in the fridge for months after the expiry date. In a few instances, informants were completely unaware of some items in their refrigerator and proceeded to discard these items when they were pointed out by the researcher during the fridge ethnography stage. Block et al. (2016 pg. 299) help to explain these findings through consumers' reliance on the ‘availability’ heuristic. They state that, “when consumers make decisions about what food to consume (e.g. what to eat for dinner), food that was purchased most recently (and therefore that is likely stored in a more visible location within the consumer’s refrigerator, freezer or pantry) is likely to be more accessible in terms of

both physical proximity and memory”. Therefore, food that is more visible is likely to be selected for consumption, and consequently older items get pushed to the back until they are forgotten about.

5.2.3 Discarding of Food Waste

A study by Thyberg and Tonjes (2016) found that many people, especially younger generations, often throw away unconsumed goods as they are not worried about consuming all the food they purchase before it goes off or expires. Furthermore, findings from a study completed by the NSW EPA (2012) found that one-third of respondents in the study reported discarding leftovers immediately after a meal or kept them in the fridge or freezer only to dispose of them later. It was found that these behaviours occurred because of factors such as the perceived value of food, as well as time-poorness. These behaviours were also illuminated throughout the current research where leftovers were largely identified through analysis of avoidable waste in the garbology section of the study. Moreover, throughout the interviews, a majority of the informants stated that they regularly had leftovers, however they often failed to consume all of these, and therefore, they more often than not, went to waste. The desire to be a good provider (Evans, 2011; Graham-Rowe, Jessop & Sparks, 2015) is a potential explanation of these findings as many consumers possess the fear of not having enough food. This can be a cause for concern when cooking for groups, especially in a flatting situation, as individuals may over prepare to reduce the risk of not having enough food and flat members going hungry.

Throughout the literature, one of the most common factors that drives consumers to discard leftover food is the risk of foodborne illness and the desire to eat only the freshest foods, with consumers regularly using date labels to make decisions on when to discard food (Aschemann-Witzel, 2015; Neff et al., 2015). The NSW EPA (2012) found that date labels were one of the biggest influences on food wasting behaviours for consumers aged 18-24. Consequently, this group is more likely to view all labels as safety indicators and are, therefore, more likely to neglect to check the quality of an item and instead discard it based on the best-before date (Boxstael et al.,

2014; NSW EPA, 2012). In this study it was found that these previous findings had some relevance. However, students were typically more concerned about the quality of their produce and the taste and freshness of the foods they were eating rather than the risk of becoming sick from foods that had passed their expiry date. Furthermore, many participants stated that they were more likely to check best-before dates because of the taste of an item rather than the risk of getting sick. This meant that they were more likely to do a smell and/or taste test and subsequently check the date. These findings can be, in part, explained through the concept of anchoring and adjustment states (Tversky & Kahneman, 1974). When a judgement is sought by an individual, they rely heavily on an estimate, or anchor, and adjust this estimate as needed. However, the estimate is generally biased towards the anchor and in the context of food, date labels, or expiry dates, serve as such an anchor. Therefore, many people have a tendency to rely heavily on printed labels, even if they do not consciously do so.

Furthermore, many of the informants also appeared to have a desire for quality and were unlikely to eat fruits and vegetables if they had any cosmetic deterioration. This desire may be the result of humans' evolutionary instinct to protect themselves from objects that may pose a threat to health or safety (White et al. 2016). Furthermore, when it comes to food, contagion operates very powerfully as individuals show strong aversions to foods that are deemed disgusting or harmful. Therefore, superficial imperfections such as a small bruised spot on a piece of fruit, or even a ripped label on a can, can act as contamination cues which trigger thoughts of health and safety (Block et al., 2016).

5.3 CHRISTCHURCH TERTIARY STUDENT FOOD WASTE PERSONAS

Based on the findings, two main groups, or personas, were able to be formed in order to classify the different types of students who sat at opposite ends of the spectrum when it came to food waste practices and behaviours. These groups have been named planners and impromptu consumers. The groups are based on findings from all four data collection methods, and therefore, involve both self-reported and actual behaviours. Based on the sample in this study, the *planners* group was

considerably smaller than the *impromptu consumers*, with the *planners* group comprised of only three of the nineteen informants.

5.3.1 Planners

The *planner* group was characterised by the individuals who reported having a well-established pre-shop planning routine. This included deciding as a flat what each flat member was going to cook on their night to ensure there was no crossover, making an extensive shopping list and sticking to this list once in the supermarket. They were also more aware of what food needed to be eaten first to avoid foods spoiling or passing their expiry dates and planned their weekly meals around this. Furthermore, they were more likely to report being competent when it came to meal preparation. This group were also more likely to have more robust waste practices in place within the flat, with an organics bin in the kitchen, which was regularly disposed of into the green-lidded bin and cleaned in-between uses. They were also more likely to claim to be good at eating their leftovers and reported throwing out smaller amounts of food waste. This matched the amount of food waste found in their general waste, which had very little contamination.

The *planner* group was found to have strong food waste management practices in place and therefore create less food waste overall. These findings were similar to the findings made by Seddon (2020) who stated that in order to reduce food waste at a personal level, consumers needed to ensure they do not: over buy; plan out what they are going to eat for the period in between supermarket visits; and use leftovers. These are all behaviours practiced by planners. However, this group was undoubtedly in the minority, and therefore, in order to reduce the level of food waste created as well as the level of contamination in general waste, these behaviours and practices need to be employed by more tertiary students in Christchurch.

5.3.2 Impromptu Consumers

In comparison, the second group, *impromptu consumers*, were the polar opposite of planners. These students had poor planning routines and were less likely to plan their meals before going to the supermarket and were even less likely to take a list. This meant they also regularly made purchases on impulse whilst at the supermarket as they did not follow any type of schedule or routine whilst shopping. Consequently, they were also unlikely to be able to give a definite answer when asked how many times they visited the supermarket each week as they may go without really needing anything. This group were also more likely to be sensitive to the cosmetic deterioration of foods which meant they were quick to throw away produce when it started showing any signs of losing freshness. Furthermore, they were also less likely to use, or have, an organics bin in their kitchen for food scraps which meant there was a great deal of contamination in their general waste.

These findings were consistent with Stefan et al. (2013) as food waste practices can be time consuming, and therefore, an inconvenience, which means many students are unlikely to engage in them (i.e. fridge inventories, planning out meals at the start of the week and sorting organic waste from general rubbish). Therefore, as time costs may reduce an individual's willingness to participate in environmentally sustainable food-related activities at home, this group of *impromptu consumers* was similar to a majority of the informants who participated in the study as well as their flat mates.

5.4 IMPLICATIONS OF THE STUDY

In this section, the implications of the findings and discussion are examined. Four key implications have been identified which includes the theoretical, marketing, policy, and methodological implications, each of which are discussed below.

5.4.1 Theoretical Implications

Theoretically, the research helped to fill a gap in existing food waste literature especially in terms of the tertiary student demographic in New Zealand. This new information not only adds to existing literature but also helps to create a foundation for future research in the field. For example, this study built on the research of Stefan et al. (2013) which investigated the role of Romanian consumers' food choices and other food related activities in producing food waste. The study found that planning and shopping routines have one of the largest influences on waste creation. This thesis helped to expand on this existing literature by exposing similar findings in the context of tertiary students in student flats whose planning and shopping routines, or lack thereof, were a major driver in creating excess food waste.

Similarly, the findings from this study also help to expand on those found by Di Talia et al. (2019). They undertook a study on food waste in rural areas of Campania and explored how living in a rural area strongly influenced individuals' food wasting behaviours. The findings in this thesis help to apply this concept into a student flatting environment. Consequently, where an individual lives, including their living arrangements (i.e. who they live with, how many people they live with) can shape their personal attitudes and behaviours towards food waste.

Furthermore, the NSW EPA (2012) found in their food waste avoidance benchmark study that date labels are one of the biggest influences on consumers aged 18-24 when it comes to food wasting behaviours. Therefore, they are more likely to view all labels as safety indicators and use them to determine whether to throw away a food item or not. In this thesis it was found that these previous findings had some relevance. However, students were typically more consciously aware of being concerned about the quality of their produce rather than whether they used best-by/use-by dates. Therefore, the research helps to expand our knowledge in terms of beginning to understand the attitudes and behaviours of this food wasting group.

5.4.2 Marketing Implications

The findings and subsequent recommendations made through the research can be utilised by marketers to develop tools to use when promoting food waste reduction strategies, especially those tailored towards students and even more so to those living in Christchurch.

Firstly, findings from the research showed that many tertiary students have a desire for quality produce and quickly reject foods with any cosmetic defects or deterioration. This desire is deep rooted in evolutionary instinct, as discussed under the discarding of food waste, and is reinforced by marketers, by only offering ‘picture perfect’ fresh and packaged foods. In many circumstances produce that is cosmetically undesirable, either due to being ‘ugly’ or suffering from a loss of freshness, is still edible. Therefore, marketers could utilise this attitude towards food as a marketing opportunity to not only educate consumers but also make imperfect produce more common on the shelves of supermarkets. This will help to encourage consumers to acquire produce, at a reduced rate, that would otherwise be wasted. The French grocery chain, Intermarche, has already taken on this mindset with their television and print campaign, “Inglorious Fruits and Vegetables”. The campaign, of which the goal was to present cosmetically unappealing fruits and vegetables in a positive light, was believed to have increased sales of “inglorious” fruits and vegetables by 1.2 million tonnes within its first two days (Yale Environment 360, 2014).

Moreover, marketers have been able to capitalise on, not only tertiary students’ but all consumers’ lack of planning and ability to stick to a plan whilst shopping through the point-of-sale environment. Although marketers use point-of-sale to encourage and reinforce consumer spending, it is believed that in the US for every \$1,000 USD generated by supermarkets, 10 pounds of food waste is created (Food Marketing Institute, 2014). Therefore, it is important to research alternative approaches to ensure that marketers are still able to reduce their costs through this marketing approach but also aid in the reduction of local and global food waste. One option is through the use of consumer applications. At present there are already a range of publicly available mobile applications for helping with the creation of shopping lists and planning. However, more attention could be given to the pre-shopping stages including home inventory and weekly planning.

This could include information, interactive games and reminders on how to complete and make use of a successful home inventory, including the pantry, refrigerator and freezer. This would help consumers towards purchasing only what they need and items that they know will be used in order to minimise the amount of food that goes to waste.

Based on the findings from the study a second recommendation for marketers is a student oriented-meal kit. For example, tertiary providers in Christchurch should develop student oriented-meal kits, similar in design to the services of companies such as My Food Bag and Hello Fresh (Hello Fresh, 2020; My Food Bag, 2020). These kits should be affordable for the student population (i.e. less than \$5 a portion), as well as requiring minimal time and effort by simplifying purchase and preparation for the user. These meal kits are designed with the idea of encouraging more students to enter into the planner group. By taking away the barriers that block them from joining this group and organising many of the key practices required for minimising food waste they are likely to encourage change. Furthermore, based on the success of meal kits throughout New Zealand they also have a high likelihood of gaining traction in the student market.

5.4.3 Policy Implications

In terms of the policy implications, the findings from the study can be utilised as tools of change for not only policy makers in Christchurch, but also those throughout New Zealand. By re-examining how they manage their three-bin system, the Christchurch City Council can utilise the findings in order to change policy related to the system. This will help to ensure people are using their bins correctly with the hope of mitigating contamination of food waste in the general waste stream. Furthermore, other councils throughout New Zealand can use the data to implement their own municipal kerbside organics collection in order to help reduce total food waste throughout New Zealand and the contamination of food waste in landfills. This can be of benefit not only to the environment itself, but also the local economy as seen through the Living Earth processing plant in Canterbury which converts local food waste into compost which is sold to consumers to help in the formation of a circular economy (Living Earth Limited, 2019).

In order to counteract students' desire for quality as well as their conscious and subconscious use of expiration dates, policy makers could also look to re-evaluate the law-imposed constraints created through dates labels on food. This could be achieved through reconstructing the current date labelling regulations in New Zealand in order to help reduce the complexity of the system and ensure labels are easy to read and understand. One option is to provide a freeze-by date on perishable items such as meat and bread, to give consumers an opportunity to save items for a later date. Further education could also be provided on the current date-labels, such as in supermarkets so shoppers understand the dates provided on their foods before they purchase them.

Finally, policy makers can also use the findings to help educate tertiary students and create a heightened sense of awareness of food waste among this food wasting group. As seen through the students' laziness and neglect towards sorting through their rubbish, policy makers could attempt to combat these findings through engaging in education campaigns directed at tertiary students in Christchurch. These campaigns could focus on the ability to save money by not wasting food. They should also stress not only the importance of minimising food waste but also the importance of using the green lidded bins provided by the council. This could be achieved through providing the resources necessary and educating the group on how to initiate a plan to correctly and successfully use the bins. There is also an opportunity to start education before students move into their first student flat to ensure they have sufficient knowledge and instill favourable food waste attitudes and behaviours. This could be achieved by targeting high school aged students, before they leave to begin tertiary studies, or alternatively first year students living in halls of residence.

Therefore, a second recommendation is to use an educational campaign to foster change within tertiary students in Christchurch in terms of their food wasting behaviours and attitudes. With the main focus of reducing overall food waste, and secondly correctly sorting through waste and using each of the three bins provided by the Christchurch City Council. In order to encourage this change, tertiary providers and policy makers alike could employ social media influencers to promote favourable food waste behaviours through their online platforms such as Instagram and Snapchat. This target group is susceptible to influencer marketing due to their high use of social media with 67% of those aged 18-29 actively using Instagram and 62% of those aged 18-29 actively using

Snapchat (Sprout Social, 2020). The campaign may also see greater success if it is centered around how minimising food waste can save the individual and their flat mates money in both the short and long term, rather than focusing on the societal good that comes from minimising food waste. Moreover, as well as posting digital content to help educate tertiary students on food waste practices, influencers could also run competitions in conjunction with stakeholders such as the University of Canterbury Students Association. This may help to spark the interest of students more by incentivising favourable practices by giving them the opportunity to win prizes.

5.4.4 Methodological Implications

An array of qualitative methods were employed during the research, each of which brought another level of depth to the study. The use of fridge ethnography and garbology in the New Zealand context is very sparse and therefore the use of these approaches adds to the limited literature on these methods. Although both the fridge ethnography and garbology stages brought about a greater depth of information, the lack of use in previous literature meant they were constructed to suit the research through incorporating information on the methods from a range of different sources. Therefore, it is believed they could be developed further in future research so that they are used more effectively and help to gain more succinct findings.

5.5 LIMITATIONS

Price and Murnan (2004) define the limitations of research as the attributes of the methods which have the potential to influence the analysis of the results. Therefore, it is important to acknowledge any constraints of the results, including methodological limitations and limitations of the researcher, and conclusions made from the study.

5.5.1 Methodological Limitations

The measures used to collect data is an important limitation to consider. As participants were found through non-probability convenience sampling it meant that the sample was drawn from the population close to hand. Therefore, although gender and flat composition were noted throughout observation, other characteristics such as ethnicity and income were not. These variables were not included in order to reduce the scope of the research as well as the use of resources and time for development and analysis. Consequently, this method had the potential to create some bias within the participant population and employing a more ethnically diverse participant pool may have led to different results.

Moreover, due to the time constraints of the research time frame, each participant was observed just once. In order to gain more trustworthy results, especially in terms of fridge ethnography and garbology, informants could have been observed a second or third time with the volume of food waste recorded each time. This would have also helped to reduce the risk of the bins having just been emptied, as one participant had no waste to sort through as their red and green lidded bins had been emptied by the council that morning which meant there was no waste in the kitchen.

5.5.2 Limitations of the Researcher

Interview transcripts were utilised by the researcher which ensured that all the key themes were discussed during the interview. However, in hindsight, it appears that participants could have been probed further or asked to elaborate on certain answers. This would have helped to gain an overall deeper understanding and may have helped to develop the key themes. Subjectivity to bias from the researcher is another important limitation to consider. Although ideally no bias would be present during research, all humans perceive reality in their own terms and therefore as the researcher had membership in the population itself it created some bias. This was present during observation as any comments made by the researcher had the potential to influence the words or actions of the informants.

5.6 FUTURE RESEARCH DIRECTIONS

From the findings and limitations discussed in this chapter, a number of directions have been identified for future research. The main direction considered is to replicate the research at a larger scale. This could involve observing a greater number of student flats from around the Christchurch area in order to gain a deeper insight or alternatively implementing recurring observations of student flats. Another possible direction is to integrate more in-depth measurement methods. This could include quantifiably measuring and weighing the food waste found during the garbology stage in order to determine the true amount of contamination found in the general waste. Another option would be to ask participants to record personal food diaries. It could also be of interest to perform the study in alternative demographic locations to see how the findings compare to tertiary students in areas which do not have a municipal organics kerbside collection. Moreover, consideration could also be given to different social groups, including the ethnicity of participants, when comparing the results obtained. Finally, the study could also be replicated in other areas of New Zealand where there is currently no municipal kerbside organics collection. This would help to provide a comparison between the food waste attitudes and behaviours of tertiary students in Christchurch, who have extra resources available to them (i.e. the kerbside organics collection), to those students who do not. Ultimately it would provide information as to whether tertiary students in Christchurch are unique in their food wasting practices and furthermore, help to determine whether the results are generalisable to tertiary students throughout New Zealand, rather than specific to those in Christchurch.

5.7 CONCLUSION

This chapter offered a discussion of the primary findings of the research which included: the context, such as the impact of a students living arrangements on their likelihood to create food waste; the established behaviours of tertiary students living in student flats; and the discarding of food waste by tertiary students living in student flats. From these major findings two groups were able to be formed in order to classify the two different approaches or mindsets taken by students

when it comes to food waste practices and behaviours. These were found to be *planners* and *impromptu consumers*. The implications of the research, including theoretical, marketing, policy and methodological implications were then discussed. Based on these implications, as well as the two types of consumers identified, recommendations for a student-oriented meal kit and an educational based campaign were made to help take away the barriers restricting *impromptu consumers* from entering the more desirable *planners* group. The methodological limitations and limitations of the researcher were then each discussed which included the measures used to collect data, and the research time frame, as well as the inefficient use of probing and bias, respectively. Future research directions were then identified based on the limitations of the current study.

Overall, the research can be considered an attempt to integrate an observational approach to research the behaviours and attitudes linked to preventing household food waste, and how these particular food waste management personas can be shaped. Due to the highly complex nature of the issue the information found aims to provide marketers and policy makers with up-to-date knowledge surrounding the issue. Furthermore, as the literature expands, these themes become benchmarks and tools for policymakers, to mitigate foreseen problems of food waste on the environment as well as the social and economic impacts it can have on communities worldwide. Having a better appreciation of today's students and their challenges can enable policy makers and marketers to develop effective strategies and outreach programmes.

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7. APPENDICES

7.1 INFORMATION SHEET

Information Sheet

Department: Business and Law
Telephone: +6433694073
Email: alm206@uclive.ac.nz
22 July 2019
HEC Ref: 2019/105



Understanding food practices among university students living in student flats: Implications for marketers and policy makers

Information Sheet

My name is Aimee McMaster and I am a Master of Commerce student at the University of Canterbury. I am conducting my thesis on how students living in flats manage their food practices.

You are being presented with this information sheet as you have expressed interest in participating in the study and meet the requirements of being a University student, over the age of 18 years old, live in an independent living situation and are responsible for some portion of the grocery shopping and meal preparation.

If you choose to take part in this study, your involvement in this project will include allowing me to come into your flat and observe you preparing a meal. The process will also include a short informal interview. The process will take approximately 1 hour. Notes will be taken by the researcher and the interview will be audio-recorded. To thank you for your participation you will be given a \$20 grocery voucher.

Participation is voluntary and you have the right to withdraw at any stage without penalty. You may ask for your raw data to be returned to you or destroyed at any point. If you withdraw, I will remove information relating to you. However, once analysis of raw data starts on the 30th of November it will become increasingly difficult to remove the influence of your data on the results.

The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation: your identity will not be made public as pseudonyms will be used in the write-up and you will therefore, not be identifiable. To ensure confidentiality, data gathered will be kept confidential, stored securely and destroyed after 5 years. No one except me and my supervisor, Lucie Ozanne, will have access to the data. A thesis is a public document and will be available through the UCLibrary.

Please indicate to the researcher on the consent form if you would like to receive a copy of the summary of results of the project.

The project is being carried out as a requirement for a Master's of Commerce, by Aimee McMaster, under the supervision of Lucie Ozanne and Paul Ballantine, who can be contacted at lucie.ozanne@canterbury.ac.nz, paul.ballantine@canterbury.ac.nz. They will be pleased to discuss any concerns you may have about participation in the project.

In the Business School at the University of Canterbury we value Tikanga Māori and Mātauranga Māori. I have had an opportunity to talk about the initial objectives of this research with our Associate Dean Māori, Dr Tyron Love. If you have any questions, which I cannot answer directly, then Dr Love is more than happy for you to contact him at tyron.love@canterbury.ac.nz or on 027 406 4286.

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee, and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

If you agree to participate in the study, you are asked to complete the consent form and return to Aimee McMaster via email at alm206@uclive.ac.nz

7.2 DISCLOSURE STATEMENT

Debrief Sheet

Department: Business and Law
Telephone: +6433694073
Email: alm206@uclive.ac.nz
22 July 2019
HEC Ref: 2019/105



Understanding food waste produced by university students living in flats: Implications for marketers and policy makers

Debrief Information

Thank you for participating in this study. The general purpose of this research is to create a foundation for reducing the overall food waste created by university students, specifically those living in flatting situations.

During the study, you were asked to prepare a home cooked meal. You were told that the purpose of the study was to understand general food practices among university students, however, this is not fully accurate. The actual purpose of the study was to understand the food waste produced by university students living in flats. This was not disclosed at the beginning of the study in order to ensure reliable data was gathered and you did not adapt your current practices too much.

Because you were deceived, you now have the right to refuse to allow any notes and information gathered from you thus far to be used and asked that they be destroyed immediately. If you do so, there is no penalty. You will still receive your reward for participation in the study.

- ☐ I **give** permission for my information to be used in the analysis of this research.
- ☐ I **DO NOT** give permission for my information to be used in the analysis of this research. Please withdraw them from the study and destroy them immediately.

Name: _____ Signed: _____ Date: _____

Thank you again for your participation in this study. If you have any further questions or concerns about any aspect of the study, please contact Aimee McMaster (alm206@uclive.ac.nz) or Lucie Ozanne (lucie.ozanne@canterbury.ac.nz).

If you feel especially concerned about any aspects of the study, or have any complaints please feel free to contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)

Interview Guide

1. How many people currently live in your flat?
2. How often do you share meals together?
3. How many people are responsible for purchasing food?
4. How many people are responsible for cooking?
 - a. How do you manage cooking? Does the same person cook all the time? Do you rotate? Or, does everyone do their own?
 - b. Who else gets involved in the cooking process (e.g., prep, cleaning up)?

Section One: **Shopping Behaviours**

1. How often do you go to the supermarket?
2. Do you take a list with you when you go to the supermarket?
 - a. Is it extensive? Or do you just write a few things down?
3. Do you plan your meals out each week before you go to the supermarket?

Section Two: **Cooking Behaviours**

1. Tell me the thing you like most/least about cooking for yourself or your flatmates?
2. What is your favourite/least favourite meal to cook?
3. Do you consider yourself a good cook?
 - a. Why/why not?
4. How often do you cook each week?
 - a. I.e. do you share the cooking around or cook individually?
5. Do you usually have leftovers?
 - a. Do they usually get eaten?

Section Three: **Overall Waste Behaviours and Attitudes**

1. What do you do if you notice some of your produce is starting to go off?
2. Do you take notice of use by/best by dates?
 - a. Do these dates concern you i.e. for your health?
3. How do you manage food waste in your flat?
4. Is this different to how your parents manage it at home?
5. Who is responsible for taking the rubbish/recycling/compost out?
6. Can you walk me through the system you use here?
7. Can you show me where your green bin is?
8. Would you be willing to let me examine the contents of the rubbish bins in your kitchen? (Give participant rubbish information sheet and consent form)

7.4 ETHICS APPLICATION

Human Ethics Committee – Student Application



For Office Use Only –	HEC Reference:	
Date Received:	Reviewers:	
Date Approved:	Approved:	(HEC Chair)

HUMAN ETHICS APPLICATION COVERSHEET – STUDENT

Please remember that your audience for this application form, as well as all forms for participants, will include community members and scholars from outside your discipline and therefore must be written in everyday language. Please do not delete any part of this form.

This form should be completed after reading the *Research Involving Human Participants* issued by the Human Ethics Committee available at <http://www.canterbury.ac.nz/humanethics>

Will another ethics committee review this application?

- If a New Zealand Health and Disability Ethics Committee (HDEC) is reviewing your project, please send your HDEC application to us with this coversheet, and then the approval. You do not need to fill out the full University of Canterbury application form.
- If you have ethics approval from another institutional ethics committee (e.g. another New Zealand or Overseas University ethics committee) and you will conduct your research in the country of that ethics committee, please send this coversheet only with that application and the later approval letter, and an explanatory email. You do not, initially, need to fill out the full University of Canterbury application form.

Please ***Bold*** your answers

Project Title: Understanding food waste produced by university students living in flats: Implications for marketers and policy makers

Status of Research: Masters

Applicant

Name: **Aimee McMaster**

University Programme/ Department: **Masters of Commerce**

Applicant's Email: **alm206@uclive.ac.nz**

Primary Telephone No:

Primary Supervisor Title, given name and family name

Name: **Associate Professor, Lucie Ozanne**

University Programme/ Department: **College of Business and Law**

Supervisor's Email: **lucie.ozanne@canterbury.ac.nz**

Primary Telephone No:

Other Supervisors

Secondary Supervisor Title, given name and family name

Name: **Head of School, Paul Ballantine**University Programme/ Department: **College of Business and Law**Supervisor's Email: **paul.ballantine@canterbury.ac.nz**

Primary Telephone No:

RESEARCHER'S SIGNATURE

I, Aimee McMaster, have considered, the various ethical issues involved in this research and have personally completed the application form; I have discussed this proposal with my supervisor(s), and I will conduct this research within the bounds of any approval given by the Human Ethics Committee of the University of Canterbury.

Signed:  _____ Dated: 25 July 2019

Is the approval of this application a necessary pre-requisite for the Dean of Postgraduate Studies to formally accept your PhD proposal? [YES/NO]

SENIOR SUPERVISOR'S SIGNATURE

As the primary supervisor of Aimee McMaster's research project I, Lucie Ozanne, consider that the design and documentation are of a standard appropriate for a research project carried out in the name of the University of Canterbury.

Signed:  _____ Dated: 25 July, 2019

LOW RISK PROCESSES (TO BE COMPLETED BY THE PRIMARY SUPERVISOR)

The low risk process for students differs from a full application only in that it is examined solely by the Chair of the Human Ethics Committee. As a result it may be possible to reply to the applicant in 7 days. It is to be signed only by supervisor(s).

Please explain why the research is low risk, noting the information overleaf
If no explanation is provided, the application will be considered a full application.

Signed (Senior/Primary Supervisor only) _____ Dated:

Low Risk application information:

Research may be considered low risk when it arises from

- a Masters or PhD theses where the projects do not raise any issue of deception, threat, invasion of privacy, mental, physical or cultural risk or stress, and do not involve gathering personal information of a sensitive nature about or from individuals.
- b Masters or PhD level supervised projects undertaken as part of specific course requirements where the projects do not raise any issue of deception, threat, invasion of privacy, mental, physical or cultural risk or stress, and do not involve gathering personal information of sensitive nature about or from individuals.
- c Undergraduate and Honours class research projects which do not raise any issue of deception, threat, invasion of privacy, mental, physical or cultural risk or stress, and do not involve gathering personal information of sensitive nature about or from individuals, but do not have blanket approval as specified in Section 4 of the Principles and Guidelines.

3. No research can be counted as low risk if it involves:

- (i) invasive physical procedures or potential for physical harm
- (ii) procedures which might cause mental/emotional stress or distress, moral or cultural offence
- (iii) personal or sensitive issues
- (iv) vulnerable groups
- (v) Tangata Whenua (if in doubt please see the comments under question 12 on the application form)
- (vi) cross cultural research
- (vii) investigation of illegal behaviour(s)
- (viii) invasion of privacy
- (ix) collection of information that might be disadvantageous to the participant
- (x) use of information already collected that is not in the public arena which might be disadvantageous to the participant
- (xi) use of information already collected which was collected under agreement of confidentiality
- (xii) participants who are unable to give informed consent
- (xiii) conflict of interest e.g. the researcher is also the lecturer, teacher, treatment-provider, colleague or employer of the research participants, or there is any other power relationship between the researcher and the research participants.
- (xiv) deception
- (xv) audio or visual recording without consent
- (xvi) withholding benefits from “control” groups
- (xvii) inducements (over a nominal amount of \$20, for example to recompense travel costs)
- (xviii) risks to the researcher

This list is not definitive but is intended to sensitise the researcher to the types of issues to be considered. Low risk research would involve the same risk as might be encountered in normal daily life.

DESCRIPTION OF THE PROJECT

1. What does the project seek to do?

The overall goal of the research is to create a foundation for reducing the overall food waste created by university students, specifically those living in flatting situations.

2. What is the research question or hypothesis of this project?

1. To determine what sorts of food are being wasted among university students living in independent living situations (student flats) in Christchurch.

2. To determine whether food is being properly disposed of (composted) by university students living in student flats in Christchurch.

3. To determine the factors that lead to food wastage among university students living in student flats in Christchurch.

3. Describe how this project arose

This project is my masters research project. I became interested in the topic after hearing of the catastrophic effects excess food waste creates, not only from an environmental perspective but also a social and economic perspective. After learning about these detrimental consequences I began noticing a real lack of awareness surrounding the issue, especially from my fellow flatmates and wider university group, many of which I noticed did not even have a green 'organics' bin in their flats. This prompted me to enquire further into the topic and my growing interest has lead me to undertake a study in this particular area for my master's thesis.

4. How will you go about answering the research question?

An ethnographic study will be used to explore the research goals. The study is designed to capture a sense of actual behaviour rather than reported behaviour. This is important as being environmentally friendly is becoming more socially desirable and therefore it is likely to result in more consciously reported waste behaviours. The study will be complemented by qualitative interviews, fridge ethnography, and garbology in order to determine the missing link between what is purchased and what is discarded, how it is discarded, and the factors and behaviours which influence these decisions.

Fridge ethnography and garbology involve examining the contents of the participants fridge and rubbish bins and will provide insight into the connection between what is purchased and what is discarded (Damron-Martinez & Jackson, 2017). Fridge ethnography involves taking an inventory of the contents of the refrigerator. Fridge studies can produce rich data consisting of the inter-connectedness between what a participant says and reality (Hebrok, & Heidenström, 2019).

Garbology is an applied science that explores how humans dispose of, and create, waste (Rathje, 1996). The method started as a way to explore the archeology of today and has developed into

the study of contemporary remains as opposed to ancient ones (McTaggart, 2015). The process can help to develop better ways to not only deal with our waste but also stop the creation of it as well as provide empirical evidence that often contradicts what people are self-reporting (McTaggart, 2015).

INFORMATION ABOUT THE PARTICIPANTS

5. Who are the participants and why have they been chosen to be asked to participate?

University students have been selected as the research group as it has been identified within the literature that they are one of the largest food wasting groups however their food waste behaviours and attitudes are rarely studied, especially in a New Zealand context (Bravi, Murmura, Savelli & Viganò, 2019; Clayton, 2017).

Young adults have been found to be the portion of the population most inclined to waste food and are therefore one of the largest sources of preventable food waste (Bravi, Murmura, Savelli & Viganò, 2019; Nikolaus et al., 2018). Thyberg & Tonjes (2016) found that 38% of 18-24 year olds in Australia wasted more than \$30AUD on food every two weeks, compared to only 7% of those 70+. Nikolaus et al. (2018) claim that this is due to their heightened spontaneity levels, desire for convenience and their limited food management experience. Furthermore, Leblanc (2019) argues that millennials are not as 'green' as many people would believe and after moving out of home they are less likely to have sound rubbish and recycling practices in place in comparison to their parents.

6. How many participants will be involved (of each category where relevant)?

15 - 20 individuals will be required, or until data saturation is reached.

7. What selection criteria and/or exclusion criteria will you use?

Participants will be eligible to participate in the study if they meet the following criteria:

- a) University student, over 18 years old**
- b) Live in an independent living situation (student flat)**
- c) Are responsible for some portion of the grocery shopping and meal preparation**

Furthermore, an equal divide between male, female, and mixed student flats will be required.

8. Describe how potential participants will be identified and recruited?

I will advertise via the UCSA noticeboard students to find students who are interested in taking part and allow them to 'opt in' to the study.

9. Does the project involve recruitment through advertising?

YES – A Facebook post made on the UCSA noticeboard will read:

Hello my name is Aimee McMaster and I am a Master's of Commerce student at the University of Canterbury. I am conducting my thesis on how university students living in student flats manage their food preparation. I am looking for potential participants who would allow me to visit their

flat and observe them cooking a meal. The process will take approximately 1 hour and you will be given a \$20 supermarket voucher in recognition for your contribution. If you would be interested in taking part in this study please contact me through Facebook or by email alm206@uclive.ac.nz.

10. How much time are participants asked to contribute to the research?

1 hour

11. Is any form of inducement to be offered?

YES - An incentive to participate will be provided through the use of a \$20 supermarket voucher, which will be funded by University of Canterbury department funds.

12. How will the participants be treated?

Respondents will be provided with information before they agree to participate in terms of what would be required of them.

They will be asked to perform their everyday meal preparation routine. They will simply be observed in their home and not judged or influenced in any way. This observation will involve approximately 30 minutes for preparation and cooking time. Note-taking will occur during the observation and will include things such as how much food waste is being created in the process, what types of foods are being wasted and how the participant is managing the food waste they create. This will be followed by a semi-structured interview which will take approximately 15 minutes. Finally I will ask if the participant will permit me to examine the contents of the rubbish bin housed in their kitchen, which will take approximately 15 minutes if the participant allows, including putting the contents onto tarps in the back yard and determining where most of the food waste ends up, for example, did any compostable food waste end up in the regular rubbish bin. However, if the participant is uncomfortable with this process I will not try and sway them otherwise. In order to mitigate risks during the process, protective, heavy duty gardening gloves and a facemask will be worn when examining rubbish as exemplified in a 1985 garbology study undertaken by Cote, McCullough & Reilly on the effects of unexpected situations on behaviour-intention differences. Wearing heavy duty gloves will help to mitigate risks from things such as needle-stick injuries and broken glass. The rubbish will also be taken outside and tipped onto a tarpaulin, which I will take with me. This will mean I will be able to visually examine the contents with as little direct contact as possible. I will also carry a basic first aid kit and anti-septic hand sanitiser with me at all times.

There will still be some level of bias with a researcher present, however, traditional methods such as interviews and focus groups have been found to generate a higher level of bias as individuals tend to under estimate their consumption habits when they are freely volunteering information on these habits (Lehmann, 2015). In comparison, “garbage does not lie” (Damron-Martinez & Jackson, 2017). Using deception at the start of the study will also help to reduce bias (discussed further below).

13. Will forms for participants need to be translated?

NO

14. Will the project require engagement and consultation with iwi Māori?

NO

Will the design, implementation or outcomes of the project have implications for iwi Māori?

NO

- Will there be significant Māori content, use of culturally sensitive material or knowledge?

NO

- Will the research require access to Māori sites, or sampling of flora/fauna?

NO

- Will there be Māori participants or subjects?

MAYBE – I am not recruiting based on ethnicity, nor will I exclude anyone based on their ethnicity. Thus, there may be someone of Māori ethnicity that agrees to participate. In regard to this I have discussed the initial objectives of my research with Associate Dean Māori, Dr Tyron Love, in regards to Māori consultation. I will also keep him informed throughout the process.

- Will the ethnicity of participants be recorded and likely to result in different treatment for Māori participants during the study or result in statements specifically about Māori in the results?

NO

OTHER PARTIES WITH AN INTEREST IN THE RESEARCH

15. Does the project require permission of an organisation, other people, to access participants or information?

NO

16. Will the project require Community consultation?

NO

17. Is the project funded externally?

NO

18. Is the project commissioned by or carried out on behalf of an external organisation(s)?

NO

19. Is the project to be part of the CEISMIC digital archive?

NO

DATA COLLECTION

20. Does the project involve a questionnaire?

NO

- (a) Explain how and why the questionnaire(s) will be anonymous or confidential

N/A

- (b) Explain how the questionnaire will be distributed and collected.

This form should be completed after reading the *Human Ethics Policy* issued by the Human Ethics Committee available at <http://www.canterbury.ac.nz/humanethics>

N/A

21. Does the project involve a structured or semi-structured interview?

YES

- **Shopping behaviours - such as how often they shop, do they take a list to the supermarket**
- **Cooking behaviours - such as do they enjoy cooking, do they consider themselves a good cook**
- **Overall waste behaviours and attitudes - such as what do they do with produce that is starting to go off, do they look at use by/best by dates, how do they manage food waste in their home**

22. Does the project involve an unstructured interview?

NO

23. Does the project involve focus groups?

NO

24. Does the project involve recording of Audio, Video or Images?

YES – Audio recording of interviews in order to transcribe afterwards. The audio recordings will be deleted after transcription whilst the transcriptions will be kept secure and then destroyed after 5 years with only the researcher, supervisor and the specific participant having access.

Recording of fridge ethnography and examination of rubbish will include note taking.

25. Will participants will be given the opportunity to check the transcript and/or notes of their interview/focus group?

YES

Participants will be able to contact the researcher (Aimee McMaster) at any time before 20th December 2019 to review and/or withdraw their transcript. After this date the thesis will have been submitted for a final review and any changes will not be possible.

INFORMED AND VOLUNTARY CONSENT

26. By whom and how will information be given to potential participants?

A copy of the information sheet and consent form has been attached. These will be given to potential participants who have expressed interest in participating in the study either via email or through Facebook. If the Consent Form is not received back within the time frame, participants will be reminded that they are still able to participate, however, if I do not hear from the participants after the first reminder it will be assumed that the person is not interested.

27. Are all participants competent to give consent on their own behalf?

YES

If no, please explain, N/A

- (a) why they are not competent to give informed consent on their behalf?
- (b) how consent will be obtained in the absence of that competency?
- (c) if applicable, how will assent to participate be gained?

PRIVACY AND CONFIDENTIALITY

28. Will information pertaining to or about the participants be obtained from any source other than the participant?

NO

29. Is information that identifies participants to be given to any person outside the research team, or if identification of or attribution of comments by participants is sought, please explain how and why.

NO

30. Please explain how confidentiality of the participants' identities will be maintained in the treatment and use of the data.

Data gathered will be kept confidential, stored securely and destroyed five years after the study is complete in accordance with the HEC principles. Transcribed interviews will be verbatim and participants will be able to access their transcripts and other data gathered from them at any stage and are free to withdraw themselves and their data at any time before 20th December 2019 as this is when the final draft will be submitted. Participants will also be assigned pseudonyms in the write up to ensure confidentiality.

31. Is an institution (e.g., school, business, etc.) to which participants belong to be named or be able to be identified in the publication or presentation of this project?

NO

32. Where will the project be conducted?

The research is to be conducted in private homes. This is in order to gain the best understanding of participants behaviour and allow for the analysis of actual behaviour rather than merely reported behaviour.

As the research will be conducted in homes of individuals that I do not know, I will be accompanied by one of my fellow post graduate students, who I will be helping with their research in return for their time spent helping me.

If for some reason I have to enter a flat without the other student a check in system via text will be used. In this instance I will text my supervisor on arrival to the flat and then again when the study is finished and I am leaving the flat.

A field activity plan has been considered, however, I believe this is unnecessary for this particular project. Instead I will ensure that I am accompanied to each flat and have my charged cell-phone on me at all times in case of emergency. Furthermore, I will leave a detailed description of the address we are visiting; the time we are going; the estimated time we should return; and my cell-phone number; with my supervisor and one of my flat mates who will be at home for the time I am out.

RISK

33. Is there any risk to physical well-being?

Yes, the researchers when going through informants' rubbish. However, I will mitigate this by wearing heavy duty gardening gloves and a mask, carrying a basic first aid kit, and sanitising my hands after the process.

34. Could participation involve mental stress or emotional distress?

NO

35. Is there a possibility of causing moral or cultural offence, inadvertently or otherwise?

YES – Going through people's rubbish bins could inadvertently cause moral offense. Therefore in order to mitigate this risk I will only examine the rubbish bins housed within participants kitchens, i.e. not the red council bin which contains all household rubbish, in order to reduce the amount of 'personal waste' found as well as reducing potential embarrassment for the participant.

I will also ensure that I specifically ask for permission from the participant and be understanding if they are not willing to participate.

36. Is deception involved at any stage of the project?

YES

37. If yes, please describe the deception, justify its use and attach the debriefing sheet or script that you will use to debrief each participant after they have participated in the project or at the end of the project itself. Please ensure that the debriefing sheet includes an explicit reminder that the participant can withdraw without penalty given the deception involved. The use in the information sheet or consent form or questionnaire of a title that differs from the project title given in this application form, in order not to reveal the real aim of the project, is considered to be a form of deception however mild.

There will be a short period of deception involved in the beginning of observation in terms of not fully declaring the interest of the study although it will be revealed to the participants after food preparation is complete. This is necessary in order to gain reliable data, however, it is an ethical consideration. In other words, I want to see how informants manage food waste before I ask them directly, as they may give me a socially desirable response.

A more covert approach is desired in order to minimise changes in usual behaviour due to observation and ensure that the data gathered is reliable. A debrief sheet has been prepared to give to participants after the true purpose of the study is disclosed. At this point the participants will have the option to withdraw any information gathered from them with the information being destroyed immediately if they choose to do so.

DATA STORAGE AND FUTURE USE

38. Please provide details of how the data will be securely stored, and how you will separate identifying and non-identifying data.

Data will be stored and backed up on the University Servers. Any data that identifies participants will only be kept in hard copy in a locked cabinet.

39. Who, apart from the researcher and their supervisor (where applicable) will have authorised access to the data?

No one.

40. What will happen to the raw data at the end of the project?

Destroyed after five years.

41. What plans do you have for the publication of the data?

Presentation at a conference (e.g. ANZMAC, Australia New Zealand Marketing Academy Conference) and scholarly publication. The Master's thesis will also be available in the University of Canterbury Library.

42. Please describe plans for future use of the data beyond those already described above.

None

7.5 ETHICS APPROVAL LETTER



HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson
Telephone: +64 03 369 4588, Extn 94588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2019/105

25 September 2019

Aimee McMaster
College of Business and Law
UNIVERSITY OF CANTERBURY

Dear Aimee

The Human Ethics Committee advises that your research proposal "Understanding Food Waste Produced by University Students Living in Flats: Implications for Marketers and Policy Makers" has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 18th September 2019, **and the following:**

- *In the Facebook post, please change "rewarded for your time" to "in recognition of your contribution". Payment for time can have potential tax implications for participants.*

Best wishes for your project.

Yours sincerely

A handwritten signature in black ink, appearing to be 'DS' followed by a stylized flourish.

Dr Dean Sutherland
Chair
University of Canterbury Human Ethics Committee

Information Sheet

Department: Business and Law
Telephone: +6433694073
Email: alm206@uclive.ac.nz
22 July 2019
HEC Ref: 2019/105



Understanding food waste produced by university students living in flats: Implications for marketers and policy makers

Information Sheet for Examination of Rubbish Bin

The reason for examining the rubbish bins housed in your kitchen is to determine how much compostable food waste is ending up in your regular rubbish bin. This type of study is called garbology and can help to develop ways to not only deal with waste but also stop the creation of it as well as give a deeper insight into your waste behaviours than you may have been able to provide in an interview alone.

The process will take approximately 15 minutes and will involve me tipping the contents of your rubbish bin onto a tarpaulin outside and examining it. Afterwards I will return the rubbish cleanly to your bin. I will only be examining the rubbish bins from your kitchen in order to reduce the amount of 'personal rubbish' found.

If you do not wish to participate in this part of the study or do not feel comfortable, you are able to withdraw at any stage with no penalty and you will still receive the reward for participation. This will also mean that any data gathered from your rubbish bin is destroyed immediately and will therefore not be used in the write-up of the research.

This stage of the project has also been reviewed and approved by the University of Canterbury Human Ethics Committee, and should you have any complaints you should address these to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

If you agree to participate in the study, you are asked to now complete the consent form.

Consent Form

Department: Business and Law
Telephone: +6433694073
Email: alm206@uclive.ac.nz



Understanding food practices among university students living in student flats: Implications for marketers and policy makers

Consent Form for Examination of Rubbish Bin

- ☐ I have been given a full explanation of why the researcher is interested in going through the rubbish bin housed in my kitchen.
- ☐ I understand what is required of me if I agree to take part in the research.
- ☐ I understand that participation is voluntary, and I may withdraw at any time without penalty and I will still receive my reward for participation. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.
- ☐ I understand that I can contact the researcher (Aimee McMaster email: alm206@uclive.ac.nz) or supervisor (Lucie Ozanne ph: 033694073, email: lucie.ozanne@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)

- ☐ I **give** permission for the researcher to go through the rubbish bin housed in my kitchen
- ☐ I **DO NOT** give permission for the researcher to go through the rubbish bin housed in my kitchen

Name: _____ Signed: _____ Date: _____

7.8 PARTICIPANT OBSERVATION FINDINGS

Participant Observation							
	Gender	Flat Composition	Time Taken	Meal	Ingredients Used	Waste Created	Bins in Kitchen
1	Female	7 (4 girls, 3 boys)	25 mins	Vege Asian Noodle Soup *2 portions cooked	Fresh: Onion, garlic, mushrooms, tofu, eggplant, carrot	Waste: Garlic, onion skins and eggplant top → organics bin	- Organics bin (half full) → Green bin - Rubbish bin (very full) → Red bin
					Preserved: Curry paste, rice noodles, coconut milk, vegetable stock cube	Reuse: Leftover curry paste → fridge, leftover noodles → pantry	
2	Female	7 (all girls)	20 mins	Spaghetti Bolognese *2 portions cooked	Fresh: Onion, mince, broccoli	Waste: Onion skin, broccoli stalk (ate core) → organics bin	- Small organics bin (very full) → green bin - Rubbish bin (very full) → red bin - Recycling bin → yellow bin
					Preserved: Pasta sauce, pasta, pre-crushed garlic, beef stock cube, packet spices	Reuse: Half onion, leftover pasta sauce → fridge, leftover dried pasta and packet spices → pantry	
3	Male	4 (all boys)	25 mins	Laksa *4 portions cooked	Fresh: Ginger, garlic, chicken, broccoli, bean sprouts, mushrooms, tomatoes, coriander	Waste: Ginger and garlic skins → rubbish	- Plastic supermarket bag (very full) → red bin - Cardboard box for recycling → yellow bin
					Preserved: Rice noodles, laksa paste, coconut milk	Reuse: Leftover broccoli, mushrooms, bean sprouts → fridge	
4	Female	7 (all girls)t	35 mins	Chicken Red Curry *3 portions cooked	Fresh: Broccoli, bok choy, chicken	Waste: Bok choy ends, broccoli stalk and chicken skin → organics bin	- Rubbish bin (half full) → red bin - Recycling bin → yellow bin - Small organics bin (half full) → green bin

					Preserved: Coconut milk, thai red curry paste, rice Frozen: Vegetable mix	Reuse: Leftover vegetable mix → freezer, leftover broccoli, and bok choy → fridge, leftover (uncooked) chicken breast → fridge	
5	Female	6 (all girls)	55 mins	Macaroni and Cheese *6 portions cooked	Fresh: Onion, mushrooms, bacon, milk, pre-cut broccoli Preserved: Pre-crushed garlic, dry pasta, flour, garlic salt, butter, cheese	Waste: Onion skin, bacon fat → scraps bin, broccoli sauce (from packet) → rubbish Reuse: Flour → pantry, leftover mushrooms, milk and cheese, butter, pre-crushed garlic → fridge	- Rubbish → red bin - Pile of cardboard boxes → yellow bin - 'pig bin' → green bin
6	Male	6 (all boys)	80 mins	Beef Stir-fry *6 portions cooked	Fresh: Carrot, red cabbage, beef steak, onion, broccoli, capsicum Preserved: Sesame oil, soy sauce, pre-crushed garlic, sweet chilli sauce, rice	Waste: Red cabbage core → rubbish, broccoli stalk, onion skin, carrot ends, capsicum stalk and seeds → scraps bin Reuse: Leftover sesame oil, soy sauce, pre-crushed garlic, sweet chilli sauce, rice → pantry	- Rubbish bin → red bin - Scraps bin → sometimes to green bin sometimes to red bin - Cardboard box → yellow bin
7	Male	6 (all boys)	60 mins	Chicken Drumsticks *6 portions cooked	Fresh: Onion, broccoli Preserved: Packet spices, white rice Frozen: Chicken drumsticks	Waste: Broccoli stalk and onion skins → rubbish Reuse: Leftover spices and rice → pantry	- Rubbish bin → red bin
8	Male	4 (3 boys, 1 girl)	45 mins	Prawn Red Curry *2 portions cooked	Fresh: Broccoli, beans, mushrooms, onion, carrot	Waste: Onion skin, ends of beans, carrot ends, broccoli stalk → rubbish	- Rubbish → red bin - Recycling → yellow bin

					Preserved: Red curry paste, coconut cream, basmati ezi-cook rice	Reuse: Leftover rice packets → pantry, leftover curry paste → fridge	
					Frozen: Peeled and tailed prawns		
9	Male	6 (4 boys, 2 girls)	85 mins	Vege Green Curry *6 portions cooked	Fresh: Kumara, potatoes, pumpkin, broccoli, carrots, beans, onion	Waste: Kumara, potato and onion skins, broccoli stalks, bean ends → organics bowl	- Rubbish bin → red bin - Metal bowl of organics → green bin - Recycling → yellow bin
					Preserved: Chickpeas, water chestnuts, coconut milk, green curry paste	Reuse: Leftover green curry paste → fridge	
10	Female	5 (all girls)	45 mins	Roast Vegetable and Quinoa Salad *5 portions cooked	Fresh: Yellow and green capsicum, carrots, pumpkin, spinach, feta, red onion, lemon juice	Waste: Capsicum seeds and stalks, pumpkin skin, onion ends and skin and lemon rind → organics bucket	- Rubbish → red bin - Cardboard box for recycling → yellow bin - Organics bucket → green bin
					Preserved: Brown rice and quinoa mix, chickpeas, honey, garlic, ginger, oil	Reuse: Leftover brown rice and quinoa mix, honey, oil → pantry	
11	Male	10 (all boys)	80 mins	Red Duck Curry *8 portions cooked	Fresh: Free range duck, basil		2 x black rubbish bags → red bin
					Preserved: Sugar, canned tomatoes, coconut milk, rice, crushed chilli, red curry paste, fish sauce, salt	Reuse: Sugar, fish sauce, salt → pantry	
12	Male	4 (2 boys, 2 girls)	50 mins	Beef Burgers *2 portions cooked	Fresh: Potatoes, carrots, mince, egg, tomato, lettuce, burger buns, onion, mushrooms, cucumber	Waste: Onion skin, carrot ends → rubbish	- Rubbish bin → red bin - Recycling → yellow bin

					Preserved: Tomato sauce, spices, mayonnaise, breadcrumbs, cheese	Reuse: Leftover breadcrumbs → pantry, leftover vegetables → fridge	
13	Female	4 (3 girls, 1 boy)	30 mins	Zucchini Salad *3 portions cooked	Fresh: Carrots, zucchini, avocado, pomegranate, fresh herbs, coconut yoghurt, lime, watercress	Waste: Avocado stone and skin, courgette ends, cucumber end and seeds, lime skin → compost bin	<ul style="list-style-type: none"> - General rubbish → red bin - Recycling → yellow bin - Compost bin → green bin
					Preserved: Dried spices, buckwheat	Reuse: Half cucumber, fresh herbs and zucchini → fridge, leftover dried spices and buckwheat → pantry	
14	Male	8 (all boys)	30 mins	Vege Yellow Curry *8 portions cooked	Fresh: Red capsicum, cauliflower	Waste: Capsicum seeds and stalk, cauliflower leaves and stalk → rubbish	<ul style="list-style-type: none"> - General rubbish → red bin - Recycling → yellow bin
					Preserved: Coconut milk, chickpeas, curry paste, rice	Reuse: Rice → pantry	
15	Female	4 (all girls)	45 mins	Venison Stir-fry *4 portions cooked	Fresh: Cabbage, carrot, red capsicum, venison, broccoli, red onion, asparagus	Waste: Carrot ends, onion skins, broccoli stalk, asparagus ends, capsicum seeds and stalk → rubbish	- Rubbish → red bin
					Preserved: Udon noodles, honey, soy sauce, oyster sauce, pre-crushed garlic, pre-crushed ginger, sweet chilli sauce, bamboo shoots	Reuse: Sauces → pantry/fridge	

16	Male	6 (all boys)	90 mins	Bangers and Mash	<u>Fresh:</u> Potatoes, cucumber, carrots, tomatoes, capsicum, mesclun salad, pork sausages, milk	<u>Waste:</u> Cucumber ends, capsicum seeds and stalk	<ul style="list-style-type: none">- Rubbish → red bin- Organics bin → green bin/compost bin- Recycling → yellow bin
					<u>Preserved:</u> Butter	<u>Reuse:</u> Butter, milk	
17	Female	3 (all girls)	30 mins	Vegetable Red Curry	<u>Fresh:</u> Cauliflower, onion, carrot, broccoli, cashews	<u>Waste:</u> Cauliflower leaves and stalk, broccoli stalk, carrot ends, onion skin	<ul style="list-style-type: none">- Rubbish → red bin- Recycling → yellow bin- Organics → insinkerator
					<u>Preserved:</u> Red curry paste, coconut cream, packet spices	<u>Reuse:</u> Frozen peas and beans, red curry paste, packet spices, half cauliflower, half broccoli	
					<u>Frozen:</u> Peas, beans		
18	Female	5 (all girls)	30 mins	Chipotle Chicken Tacos	<u>Fresh:</u> Chicken breasts, avocado, lime, coriander, pre-packaged coleslaw, pre-cut pineapple	<u>Waste:</u> Chicken skin, avocado skins and stone, coleslaw dressing	<ul style="list-style-type: none">- Rubbish → red bin- Recycling → yellow bin- Organics → green bin
					<u>Preserved:</u> Cheese, soft taco shells, mayonnaise, chipotle sauce, sriracha	<u>Reuse:</u> mayonnaise, chipotle sauce, sriracha	
19	Male	5 (all boys)	35 mins	Spaghetti Bolognese	<u>Fresh:</u> Onion, mince	<u>Waste:</u> Onion skins, half can of tomatoes	<ul style="list-style-type: none">- Rubbish → red bin- Recycling → yellow bin
					<u>Preserved:</u> Soy sauce, brown sugar, pre-crushed garlic, sweet chilli sauce, canned tomatoes, pasta sauce, dried spaghetti, sour cream	<u>Reuse:</u> Soy sauce, brown sugar, pre-crushed garlic, sweet chilli sauce, pasta sauce	

7.9 FRIDGE ETHNOGRAPHY FINDINGS

Fridge Ethnography									
	Gender	Flat Composition	Time Taken	Storage Available	Fruits/Vegetables	Dairy	Condiments	Leftovers	Other
1	Female	7 (4 girls, 3 boys)	10 mins	- 2 x fridge/freezer	- All look reasonably fresh		- Within best-by/use-by dates	- Some leftovers - Cooked mince been in fridge up to a week	
2	Female	7 (all girls)	10 mins	- 2 x fridge/freezer (one freezer doesn't work), reasonably full	- Most look a bit worse for wear	- Within best-by/use-by dates	- Many sauces and curry pastes have passed use-by/best-by dates	- Lots of leftovers, some cooking dates unknown, could be over a week	
3	Male	4 (all boys)	5 mins	- 1 x fridge/freezer, reasonably full	- Very old lettuce, has frozen - Mouldy carrots and cauliflower	- Within best-by/use-by dates	- Some have past best-by/use-by dates	- A few days old	
4	Female	7 (all girls)	10 mins	- 2 x fridge/freezer, very full - 1 x chest freezer, reasonably full	- Most look fresh, except for a few starting to go mouldy at the back of fridge	- Within best-by/use-by dates	- Most have passed best-by/use-by dates	- Up to a week old	
5	Female	6 (all girls)	5 mins	- 1 x fridge/freezer, very full - 1 x chest freezer	- Mouldy lemon	- Within best-by/use-by dates	- Within best-by/use-by dates	- Up to a week old	

6	Male	6 (all boys)	10 mins	- 1 x fridge/freezer, very full - 1 x chest freezer	- Mouldy carrots and mushrooms	- Within best-by/use-by dates	- 2 have past best-by/use-by, rest all good	- Rice, has been in fridge for a week - Coleslaw, has been in fridge for a week	
7	Male	6 (all boys)	10 mins	- 2 x fridge/freezer, very empty - 1 x chest freezer	- No vegetables	- Yoghurt expired by 5 months	- Some have past best-by/use-by dates		
8	Male	4 (3 boys, 1 girl)	10 mins	- 1 x fridge/freezer, reasonably full	- All look reasonably fresh	- Yoghurt expired by 1 month - Cream by 1½ months	- Within best-by/use-by dates	- have been in fridge 1-2 days	
9	Male	6 (4 boys, 2 girls)	10 mins	- 2 x fridge/freezer (one mostly for alcohol) - 1 x chest freezer * Doing vegan week	- All look reasonably fresh		- Some have past best-by/use-by dates	- Some leftovers, a day old	
10	Female	5 (all girls)	5 mins	- 1 x fridge/freezer, very empty	- All look reasonably fresh		- Some have past best-by/use-by dates - Some hummus 5 months past use-by		- Leftover icing for cake, few days old

11	Male	10 (all boys)	10 mins	<ul style="list-style-type: none"> - 1 x fridge/freezer - 1 x chest freezer - 1 x fridge 	<ul style="list-style-type: none"> - x2 Pre-packaged salad gone mouldy - Mouldy carrots 	<ul style="list-style-type: none"> - Milk expired by 1½ months - Yoghurt expired by 1 week 		<ul style="list-style-type: none"> - Leftover been there for "weeks" 	<ul style="list-style-type: none"> - Raw venison, few days old - Loaf of bread, few weeks old - Ham, expired by 1 month - Pastrami, expired by 2 months
12	Male	4 (2 boys, 2 girls)	10 mins	<ul style="list-style-type: none"> - 1 x fridge/freezer, very full 	<ul style="list-style-type: none"> - Most <u>veges</u> look fresh apart from some pre-packaged salads (lots of them in fridge) which have gone off 	<ul style="list-style-type: none"> - Within best-by/use-by dates 	<ul style="list-style-type: none"> - Many have expired, one in 2017 		
13	Female	4 (3 girls, 1 boy)	5 mins	<ul style="list-style-type: none"> - 1 x fridge/freezer 	<ul style="list-style-type: none"> - Some carrots and spring onions looking worse for wear, however most other <u>veges</u> look fresh 	<ul style="list-style-type: none"> - Within best-by/use-by dates 	<ul style="list-style-type: none"> - Within best-by/use-by dates 		
14	Male	8 (all boys)	10 mins	<ul style="list-style-type: none"> - 1 x fridge/freezer, very full 	<ul style="list-style-type: none"> - Vegetables at back of fridge looking a bit worse for wear 	<ul style="list-style-type: none"> - Within best-by/use-by dates 	<ul style="list-style-type: none"> - Some have past best-by/use-by, most all good 	<ul style="list-style-type: none"> - Have been in fridge for up to a week 	
15	Female	4 (all girls)	5 mins	<ul style="list-style-type: none"> - 1 x fridge/freezer 	<ul style="list-style-type: none"> - All appear to be fresh 	<ul style="list-style-type: none"> - Within best-by/use-by dates 	<ul style="list-style-type: none"> - 2 have past best-by/use-by, rest all good 		

16	Male	6 (all boys)	10 mins	<ul style="list-style-type: none"> - 1 x fridge/freezer - 1 x fridge - 1 x chest freezer 	<ul style="list-style-type: none"> - Half a tomato looks a bit worse for wear - Bean sprouts look a bit slimy - Lettuce going brown 	<ul style="list-style-type: none"> - Milk 1 expired by 5 days, 1 by 1 month 	<ul style="list-style-type: none"> - Some have past best-by/use-by dates 	<ul style="list-style-type: none"> - Some which are one night old 	<ul style="list-style-type: none"> - Some ham which has expired by 5 days - A cake which is 2 weeks old
17	Female	3 (all girls)	10 mins	<ul style="list-style-type: none"> - 1 x fridge/freezer 	<ul style="list-style-type: none"> - Most <u>veges</u> look reasonably fresh, however some looking worse for wear, especially 2x bags of carrots stored in vegetable draw 	<ul style="list-style-type: none"> - milk expired by 3½ months - margarine by 2 months 	<ul style="list-style-type: none"> - Some have past best-by/use-by dates 		
18	Female	5 (all girls)	5 mins	<ul style="list-style-type: none"> - 1 x fridge/freezer 	<ul style="list-style-type: none"> - All appear to be fresh 	<ul style="list-style-type: none"> - Within best-by/use-by dates 	<ul style="list-style-type: none"> - Within best-by/use-by dates 	<ul style="list-style-type: none"> - Leftover coleslaw, one day old 	
19	Male	5 (all boys)	5 mins	<ul style="list-style-type: none"> - 1 x fridge/freezer - 1 x chest freezer 	<ul style="list-style-type: none"> - Some <u>veges</u> looking a bit worse for wear 	<ul style="list-style-type: none"> - Within best-by/use-by dates 	<ul style="list-style-type: none"> - Some have past best-by/use-by dates 		

7.10 GARBOLOGY FINDINGS

Garbology							
	Gender	Flat Composition	Time Taken	Notes	Unavoidable	Avoidable	Possibly Avoidable
1	Female	7 (4 girls, 3 boys)	15 mins	- Large kitchen bin → reasonably full - Small organics bin → half full	Carrot ends, banana skin, lemon rind, apple core	Potato wedges, muesli bar, blue cheese	Broccoli stalk
2	Female	7 (all girls)	15 mins	- Large kitchen bin → reasonably full - Small organics bucket → extremely full, overflowing	Tea bags, lemon rind, banana skin, coffee grinds	Chicken breast, steak, cooked rice, half cucumber, brownie	
					Egg shells, chicken bones * Rest scraps	Whole apple, whole asparagus, 3x whole kiwi fruit, 3 whole bulbs of garlic	Broccoli stalk
3	Male	4 (all boys)	15 mins	- Plastic supermarket bag → very full *More food waste than any other type of rubbish in bin * No organics bin	Egg shells, orange peel, onion skin, garlic skin, ginger skin	Green curry, half a burger, cooked rice	Broccoli stalk, bread crusts
4	Female	7 (all girls)	20 mins	- Large kitchen bin → reasonably full - Small organics bucket → half full	Tamarillo skin, banana skins, avocado skin, egg shells, grape stalks	Whole pie, fried rice, half pottle of cream cheese, half cucumber, half container of hummus, tegal chicken, tortilla wrap, half block of feta	Kiwi fruit skins, salmon skin

					* Mostly scraps	Half tomato, half eaten pear, 3 full mushrooms	
5	Female	6 (all girls)	15 mins	- Large kitchen bin → reasonably full - Medium size pig bucket → half full	2x avocado skins, teabags, apple core, onion peel	3x whole carrots, 2x whole apples, cooked rice, cucumber pieces	
					* Mostly scraps	Cooked corn, cooked rice, cooked beans	
6	Male	6 (all boys)	20 mins	- Large kitchen bin → very full - Medium size organics bucket → half full	Apple core, egg shells, coffee grinds	x4 half bags of spinach, half a packet of crackers, ½ an avocado, a cheese sandwich, spring onions, container of mussels, half a lettuce, 2x half containers of hummus, half an onion, bag of onions, wedge of cheese, bag of couscous, a tomato	Bread crusts
					* Mostly scraps	- 1 ½ whole tomatoes, ½ a red onion, leftover porridge	
7	Male	6 (all boys)	20 mins	- Large kitchen bin → very full * No organics bin	Chicken bones, ham bone, egg shells, banana skin, onion skins	Cooked rice, whole pumpkin, whole broccoli, 2x tortilla wraps, cooked pasta, lemon	Bread crusts, pumpkin skin
8	Male	4 (3 boys, 1 girl)	10 mins	- Large kitchen bin → very full * No organics bin	Onion skins, apple core	Half a broccoli, eggs, corn chips, hot chips, mince, pre-crushed garlic, bag of	Kumara skins, broccoli stalk, kiwi fruit skins, bread crusts

						grated cheese, 2 pieces of bread, a piece of sushi	
9	Male	6 (4 boys, 2 girls)		- Large kitchen bin → half full - Small metal bowl → emptied after each dinner * Pretty good, way more rubbish to food waste ratio	Banana peel, teabag	Leftover takeaway salad, small part of wrap	
					Carrot ends, bean ends * All scraps made from dinner		Kumara skins, potato skins, broccoli stalk, carrot peel
10	Female	5 (all girls)	5 mins	- Large kitchen bin → half full - Small organics bucket → reasonably full * Hardly any food waste contamination	End of a carrot		
					All food scraps (i.e. no whole foods which could have been eaten)	Small amount of cooked rice	
11	Male	10 (all boys)	15 mins	- 2x black rubbish bags → very full * No organics bin	Banana skin	½ a bag of granola, a carton of eggs, muesli bar, a slice of cheese, pizza crusts, a lemon, 2x banana, 3x peppers, ½ a bottle of coke, ½ a tin of baked beans, 2 onions	
12	Male	4 (2 boys, 2 girls)	10 mins	- Large kitchen bin → half full * No organics bin	3x banana skins, egg shells, onion skins, avocado skins, carrot ends	½ a cucumber, pre-packaged lettuce	
13	Female	4 (3 girls, 1 boy)	15 mins	- Large kitchen bin → quite full - Small organics bucket → (just emptied, only scraps from dinner)	Egg shells, avocado skin and stones, chicken bones, apple core, tea bags, lemon rind	Leftover mince, cooked chicken, lettuce, leftover salad	Kiwifruit skin, broccoli stalk

					Avocado skin and stone, pomegranate skin, lime rind, courgette ends, cucumber ends	Cucumber seeds	
14	Male	8 (all boys)	10 mins	- Large kitchen bin → very full * No organics bin	Celery leaves, egg shells, manadrin peel, banana skins, avocado skin, chicken bones	2x half loaves of bread, leftover mince and pasta, vanilla custard, cooked rice, cooked spaghetti, leftover lentil curry, whole sandwich, canned peaches, ½ an onion, whole manadrin	
15	Female	4 (all girls)	15 mins	- Large kitchen bin → half full * No organics bin	Chicken bones, lemon rind, cucumber end, eggshells, onion skin, capsicum stalk and seeds, bok choy stalk, carrot ends	½ a carrot cake, ½ loaf of bread, ½ lettuce, whole tomato, chicken crumb	
16	Male	6 (all boys)	10 mins	- Small kitchen bin → quite full - Small organics bin → quite full * Organics bin contents growing fur	Carrot end	3 pieces of bread, a piece of ham, leftover mince	Chicken skin, bread crust
					Banana skins, capsicum stalk and seeds, onion skins, egg shells	Leftover pieces of bacon, cooked pasta, leftover noodles	Bread crusts, broccoli stalk

17	Female	3 (all girls)	0 mins	<ul style="list-style-type: none"> - Rubbish → red bin - Recycling → yellow bin * No organics bin (use insinkerator) * Rubbish bins emptied that morning 			
					Carrot ends, onion skin		Cauliflower leaves and stalk, broccoli sta
18	Female	5 (all girls)	10 mins	<ul style="list-style-type: none"> - Kitchen bin → full - Small organics bucket → reasonably full 	Egg shells, tea bag	Fries, salad dressing	
					Bok choy ends, avocado skins and stone, lime rind	Cooked rice noodles, leftover laksa	Broccoli stalk, salmon skin
19	Males	5 (all boys)	10 mins	<ul style="list-style-type: none"> - Rubbish → red bin - Recycling → yellow bin * No organics bin 	Onion skin, egg shells, avocado skin	Cherry tomatoes, leftover salad, corn, dried spaghetti	Bread crusts

7.11 INTERVIEW ANALYSIS SNAPSHOT

		1	2	3	4	5	6	7	8	9	10
General		mixed	male	female	female	female	male	males	mixed	mixed	female
	Meal sharing	Some meal sharing, no real system	Some meal sharing, no pattern	Very rarely in flat - cook with gf instead	Very rarely	6 nights a week	6 nights a week	24/7	Boys always share food each night	Five nights a week (one person does their own thing)	Five nights a week
	Purchasing food	All	All responsible - depends on the day	All	All	One person a week for flat - everyone for breakfast, lunch and snacks	Each person purchases there food for their flat meal- everyone for breakfast, lunch and snacks	All	All	One or two people will do the flat shop	When you cook, you buy
	Cooking responsibility	All	All	All	All	All	All	All	All	All	All
	Cooking rotation	No set rotation	No set rotation			No set rotation	No set rotation	No set rotation	No set rotation	All have their own night each week	Secide at the start of week
	Other people in cooking process	All by self	Sometimes together, sometimes alone			Usually alone	Usually alone	Do it in groups usually cause they find it funny - if you cook you clean	Sometimes together - depends who is around	Whoever is on dinner does everything	Sometimes cook together, or cover for someone if they are really stressed
Shopping Behaviours											
	Supermarket frequency	1 or 2 a week	Every day, sometimes more than once a day	3	5	1-2 a week	2-3 a week	1 time a week	2 times a week	1 time a week	3-4 times a week
	Lists	No list	No list	Mental list	Sometimes	Only if doing flat shop - usually buy on a whim	Yes - on phone for flat meals	No list	No list	Use a list each time	Use a brief list